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THE QUEST OF THE ONE BEST WAY

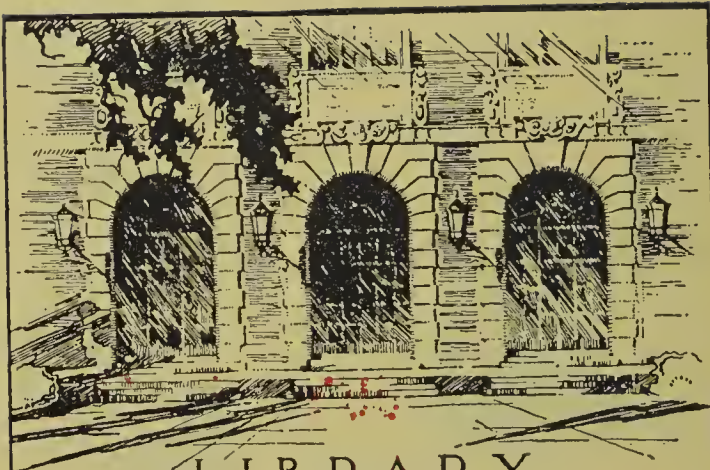
A STORY OF THE LIFE OF

FRANK BUNKER GILBRETH

By

MELLIAN MOLLER GILBRETH

PUBLISHED BY SOCIETY OF WOMEN ENGINEERS



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THE QUEST OF THE ONE BEST WAY



A SKETCH OF THE LIFE OF
FRANK BUNKER GILBRETH

BY

LILLIAN MOLLER GILBRETH

Published by

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DEDICATION

**TO THE
SOCIETY OF INDUSTRIAL ENGINEERS**

who loved the man and appreciated
his work and his ideals, this
little sketch of the life of
Frank Bunker Gilbreth
is dedicated.

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FOREWORD

Out of the world of men you came,
To open gates for me,
Into a world of happiness,
I had not known could be.

Into the world of stars you go,
And other gates swing wide,
What tho our little day is done?
Eternities abide.



Introduction

To most of us, life is to some extent a quest, whether we acknowledge it, or even know it, or not.

Many of us seek for numerous easily attained little things,—a good time; money enough to buy some small specific thing that we fancy we need or would like,—a passing interest or excitement.

Some of us seek for a few great things—also attainable, but hard to get. A fortune. Fame. The durable satisfaction of life.

A few of us seek for one thing only, and that apparently forever unattainable. These few are those who dedicate their lives to a Quest.

Such are the explorers, who push on and on seeking new countries and new marvels. Such are the treasure seekers, looking for real or rainbow gold. Such are the philosophers, searching out ultimate truths. Such are the astronomers, scanning the heavens for records of the universe.

These are the seekers!

The Holy Grail,—The Golden Fleece,—The Fountain of Youth,—El Dorado,—and now, The One Best Way!

In the old days,—treasure, divine or earthly. Today,—Knowledge.

In the old days,—leisure, beneficent or lotus eating; hermit or sybarite. Today,—Work.

In the old days,—the knight, the cavalier, the romancer. Today,—The Engineer.

Let us follow one such in his Quest,—A Twentieth Century Adventure!

The Quest of The One Best Way

CHAPTER I WHENCE

Down in Maine, the "State of Maine," in Fairfield, July 7, 1868, was born a little boy who was a Quest Maker. He came by this trait naturally, for back of him on both sides stretched a long line of those who had spent their lives not in "passing the time," but in following a determined path toward a fixed goal, and his home was typical of nineteenth century New England,—a land of ideals and idealists.

Predominant everywhere was the Puritan and Pilgrim strain. Running through everything was the Pilgrim motive, "What sought they thus afar?" The neighbors and friends of the family were the New England farmer, the seeker for knowledge, for hard problems, the follower of the straight and narrow path. The New England merchant, shrewd, inventive, resourceful, trader, whaler, sailor in his veins. The New England teacher, ambitious, conscientious. Everywhere, the New England idealist.—artist, musician, shop-keeper or home-keeper.

Such were also his own ancestors, stretching far back among the founders of America. The blood of a Massachusetts governor, Bradford, was in his veins, while going further back we find Scotch, English and French who, hundreds of years before, had been pioneers from their own to neighboring, and then far distant lands.

Fortunate is every boy with an old fashioned New England heritage, especially if it includes grandparents who are neighbors. Grandfather Gilbreth and Grandmother Gilbreth were near enough to be seen often, but not daily, but Grandfather Bunker and Grandmother Bunker were close at hand, ready to make the small newcomer welcome. Grandfather Bunker was a true patriarch, a grand old son of New England, an exponent of her sturdy ways. Father of fifteen children, he was a real head of his household, even unto the second and third generations, and tales of his achievements still make glad the hearts of his descendants.

In his case the name Daniel denoted strength as well as judgment, for one of his descendants still boasts that he was called "Bull" and that her own strength comes from the fact that she is a "double Bunker,"—that is, traces back to old Daniel on both sides. With him *right* was *might*, and to be used as such, but to be reinforced with might itself when that was necessary. As, for example, in the tale of freeing the toll bridge and, in that of defending his land when the railroad attempted to put through a right of way.

Sandy, red haired, blue eyed, and chin dimpled, Daniel Bunker handed down his physical traits to the descendants, while Grand-

mother Bunker's dark hair and eyes passed down to only a few of the children, and were not transmitted farther.

When the small boy whose Quest we are to follow came, the entire clan was located on Bunker's Island in the midst of the Kennebec River; a real New England homestead, isolated yet accessible; part of the township, yet a little community in itself. The boy was fortunate in having uncles and aunts near at hand to make much of him, though many had gone out into the world and came back now and then to report progress in their pilgrimages.

Uncle Frank and Uncle Fred were pioneers in Montgomery County, Kansas, and Uncle Fred went on from there out into the new land of New Mexico. Aunt Naomi was in far off California, serving the cause of education there. Aunt May was in Shelbyville, Kentucky, head teacher in a girl's school that was a center of culture for all the young women of the South. Uncle Ben was editing a paper, a pioneer in his line, bringing new thought to his community in new ways. Witness the fact that he made the first set of wood engravings known in that community and used them in his paper, supplying editorials to fit the cuts. The oldest uncle Samuel, was a model for the entire family and for every community to which he went,—a sterling, upright citizen. So were the other uncles and aunts, each in his own special way.

To Aunt Caroline he was always especially close, as she was for years a member of his household and his youngest aunt and "duplicate mother." A gifted artist who had exhibited in the Salon, she might have gone far in her chosen work had she not set her career aside and re-dedicated her life to her family in loving service as nurse and companion, as she was needed.

His own mother, Martha, came midway of the family group and brought to it a buoyancy of disposition, a readiness to help, and methods of clear thinking and rapid doing that stood her in good stead all of her long life. Deep stored in her heart were to her last days memories of her happy childhood, pictures that made it a real living experience to children and grandchildren and, if recorded, would have furnished valuable data on early nineteenth century New England life in Somerset County. Oh! those days of pantalettes and crinoline, of home grown fruit and vegetables, of teachers who "boarded 'round," of journeys by stage coach, of kin who traveled to far new places and brought back treasures and marvelous tales. Many was the prose "Snow-bound" that she recounted in winter evenings, tales of peace and plenty and placid pleasure in the routine of home life.

The district school of her day was composed largely of Bunkers, all of whom, being mentally and physically sound and normally ambitious, finished easily and early and went to their work in the world. Like many of her aunts and sisters and cousins, she taught in a school and later married and settled near by, to

bring up her family with the counsel of father and mother amid the pleasures and support of the clan life.

She married John Hiram Gilbreth of the line of Galbraiths, shortened to Gilbreth by a deaf recorder in the turmoil of some election when a change to his own name would have lost him his vote, and had enjoyed the distinction of having a name of his very own. The Galbraiths belonged to the clan McDonald, with a heritage of traits of the Scot. Hiram, as he was called, was a valued member of the community and the marriage was approved on all sides. His business was hardware, and he pursued it with great attention and interest. He was a pioneer in salesmanship and in advertising, and his letter paper proves that he practiced the things that his theory found valuable, for the entire back is covered with advertising,—a thing unknown in that day. Pictures of his shop also show advertising at every available place. There he sold household supplies in his line, farm supplies, also carrying on the work of the tinsmith, much interested in what could be done with the available material. This was his work. His recreation was the raising of fine stock, the best Knox horse; the best Jersey cow; the best pig. To have these, to improve the strain not only for himself but for his community and the State of Maine, this was his joy and his pastime.

Two small girls came to join the household before the birth of the boy. Anne, the older, and then Mary. Both were heartily welcomed and made much of, but the hope of every father's heart is a boy, and the advent of this one was announced to the community by the happy parent with such joy that tales of the event are still current in the community. Letters also, written to grandmother and other relatives, attest to the overwhelming joy in the House of Gilbreth at the coming of the Son and Heir.

The life of the little household was the daily routine of the community and the times. Duties, pleasures, work, play. Then, a little later, all the joys of a farming community, with a fine river to paddle in; with plenty of snow in the winter and adoring big sisters to pull him on his sled; with grandfather and grandmother, aunts and cousins to visit. What more could a small boy want?

But shining through the daily routine of the household was the life of ideals. The mother's passion all through her long life was for education. Books and newspapers, many and close at hand. A passion, not only for keeping in touch with the news of the community, but with the things that were happening in the great world. A planning, from their earliest days, to make the three children worth something in the world, by giving them the best training available. Rejoicing as musical talent appeared in the small Anne, and a passion for science in the smaller Mary.

And all sorts of hope for the aptitudes and achievements of the youngest, Frank.

This Quest for education, handed down from the older generations—for all good Bunkers went to school as long as schooling was possible or available,—was the moving passion in the mother's mind always. For it, all difficulties could be overcome, all sorrows set aside, all sacrifices made. In the father, there was appreciation of the value of this passion, and the desire to encourage it; a determination to succeed in the business world, and to better the community by providing for them 'The One Best Horse, The One Best specie of each type of farming animal,—marks to come to! And, along with this, the never spoken of, almost concealed passion for righteousness which made those who met the son say with appreciation always, "You, the son of John Hiram Gilbreth? He was a *good* man."

Such a happy life in such a happy community! The little family and clan, only one of many happy families and clans, like it, all over the state and the section, living with the simplicity and satisfaction that old time New Englanders carry with them wherever they go. Outwardly usually "plain" as to attire, as were the Quaker ancestors so many of them had, inwardly following some ideal as did their pioneer forebears. Differing from others not in their looks or in their speech especially, though these differ too, but in the emphasis they put on special things in life. You can see certain of them who carry on the type any day, now, in New England. Clothing of the best, but worn without style. Speech grammatically correct, but rich in idioms of the dialect of the little town from which they come. Known and loved by every man, woman, child, horse and dog in the communities from which they come; ready to do the tasks at home contentedly or to lay these aside if state or country call for their services. A power in the land!

Suddenly, when he was only three years old, all this beautiful life stopped for the small boy, for the father died. His wonderful horse, Gilbreth Knox, had been taken ill, and he would allow no one but himself to attend him. Overwork, heat, then severe cold, acute pneumonia, and John Hiram Gilbreth was gone. The man who was then a little boy remembered him vividly, as always ready to drop everything if he demanded attention; never too busy to be interested in his childish sports or troubles; taking him high on his shoulders to see the wonderful horse and to inspect the new barn; leading him proudly by the hand to the store to see the latest in merchandising; encouraging him to learn and try new things, and always proud of his achievements. A typical New England father and a typical New England boy, interesting because they are typical of "the race, the age and the moment." A race that is still with us, but an age that is passed, or rapidly passing. Soon to become a part of the history of this Country!

CHAPTER II

THE FIRST MILESTONES

With the death of the father, life changed completely for the small boy. There was no more contact with business through visits to the hardware store. The beautiful horse and the fine stock were all sold. A relative by marriage had been left executor to the will, but he proved a poor business manager, and the heart-broken wife was soon informed that the plentiful funds that kept her and the small family in comfort had practically disappeared. The entire clan rallied to make her feel that what was theirs was hers, and that life could go on its same smooth way, but she was unwilling to accept this. Besides, she felt that opportunities for education in a small town were limited, and, as she often said later, that there were possibilities in the three small persons under her charge that warranted the best training to be found anywhere. There were consultations of the family as to where this was to be found, and it was decided that Andover, Massachusetts, furnished the ideal spot, with Andover Academy and Abbott Academy as centers for training boys and girls, and with all the atmosphere of a town whose main business is education.

Therefore, to Andover the family went, and settled near "The Academy" to be in the atmosphere of the best education, night and day. The small Frank was too young to attend the Academy, but the older sisters went to "Abbott" and progressed rapidly.

So passed the time from his sixth to his tenth year, at first studying at home with mother, and later in the primary schools. It was during this time that the small lad began to enjoy his inherited mechanical ability, and many were the smooth broomsticks that mother saved, to be carved into intricate imprisoned balls and tiny pincers. These were scattered through his possessions and those of the household for many, many years, until his wife rescued them, to be preserved for future generations as an example of a boy's ingenuity and perseverance. In his short life, the father had recognized the transmitted mechanical ability, and almost before he could talk, supplied the small boy with hammer and nails to be driven into soft wood joyfully, hours at a time, in a warm corner by the kitchen stove. Now the favorite tool was a penknife, the treasure of every boy and many a man, some of whom still believe that a perfect edge on a knife is a fine test of personal efficiency.

The summers were long, wonderful visits to grandfather and grandmother in Fairfield, with fine chances to learn swimming, and all the tasks and pleasures of a country boy. In the winter-time, too, the "Old Town" Indians came to Fairfield, and they taught him to get the material from a tree and to make baskets.

an art which he found at his fingertips years later when recuperating at Nantucket from his fearful illness in the Army and used to teach the small boys and girls to make baskets from the eel grass.

Interesting and profitable as Andover proved to be, the mother felt that it did not entirely answer the needs of her family, especially for the best musical training for the older daughter, and so began to debate the advisability of moving again. This time, to Boston, the center of world culture, so far as a New Englander is concerned.

The small boy, of course, was delighted at the prospect of a change, but as the day set aside drew near, and the thought of leaving his many companions, perhaps forever, came gradually home to him, his passionate enthusiasm for the trip was gone. When the day for moving came, he had by no means finished his leavetaking. The mother, as always, was calm in the midst of stress and storm. "All plans are made, Frank," said she, "and we are going on a certain train. If you are here you shall go with us, and if not, we shall go just the same, and you can come on when you are ready."

What small boy could ever believe that his fond, kind mother would leave him? Surely not Frank. He took slight note of the time of departure of the train, but hastened off to join his friends and carry out the program of the day. No thought of home entered his mind until it was time for the noon dinner, then he hastened back to find the family gone and the house closed. For a moment he was daunted, but this attitude did not last long. Friendly neighbors were only too glad to supply dinner. Equally kind neighbors were ready to supply supper, bed and breakfast, and he departed in joy the next day on the train. Thus he avoided many of the troubles of moving, by the way, and was only slightly surprised and annoyed to find that his fond family had existed quite peacefully for twenty-four hours without him, not even having done him the compliment of worrying over his non-appearance.

Boston! Who can surmise its surprise and delight to a boy of ten? School itself was interesting, although it was rather a disappointment to his mother. She had expected, of course, that her young hopeful would find everything he could possibly demand in the Boston school curriculum. This, however, was not the case, and one year she took him out of school and taught him arithmetic and his other studies herself, thus enabling him to skip into an advanced grade when he went back. In her older years, she liked to picture him, lying on his stomach on the floor with his pencil in his mouth studying the long division problems which she had given him, and as she always announced, "doing them in half the time, no a *quarter* of the time of any other child that I have ever taught."

Then there was the joy of a large gang of boys to play with and an opposition gang to provide competition, and also the fun of getting the better of the policemen on the beat, and of taking part in all the holiday sports. The revels of Hallowe'en, the prolonged festivities of a real city Christmas, the joys of sliding on the Common,—all the new wonders of metropolitan life!

In many ways the boy was especially fortunate in his schooling. The Grammar School that he attended was part of the Rice Training School where the young women of Boston received their practice work in teaching, and where all the new methods were tried out on the hopefuls in the grades.

Frank was always thankful that the value of the metric system was being tested while he was there, and that his class was taught this system before learning their feet and inches. Perhaps this, although he did not realize it, was a starting point of the intense interest in accurate measurement that was to persist throughout his entire life.

From the Rice Training School he went on into the English High School, even yet one of the best secondary schools in the country, and at that time recognized as a model. The boys whom he met there, were many of them to remain his friends for life. Notably George Coleman and Albert Wiggan. Frank and George short at that time, though later to develop into large men, called each other "Stub" in the grades, and continued this always.

The years at High School passed all too quickly. Frank was at that time no student, but always managed to get by successfully. He was never known to take a book home, but seldom failed outright in a recitation. Mathematics and mechanical drawing and similar subjects enlisted his lively attention, but French, English, Grammar and Spelling occupied as little of his time as he could possibly manage. Of course the trouble was that he never was in anywise made to understand the usefulness of a modern language. These subjects seemed to him always either tasks set or imposed by the teacher, or challenges to the student as to how well he could slide through a course with the least amount of study possible. The idea of French being a tool that enabled one to understand another people, another literature and different ways, never entered his mind. There was no attempt made to teach the boys either to speak or think in the language, and at the end of their school period they escaped from French bondage with some slight knowledge of Grammar, but with little else.

As for Spelling, he showed early a positive genius for misspelling, and one of the fondest treasures of the family is a youthful paper in which twenty-four out of twenty-six words are mis-spelled. It is interesting, however, to a student of spelling to find that the mistakes are all caused either by a desire

to follow an accurate pronunciation of the word suggested, or by a logical desire to follow the spelling of some other known word. This latter explanation of spelling mistakes is well recognized, and is one of the chief arguments for Simplified Spelling. It is evident that the boy did not find spelling uninteresting, and was even somewhat amused at his errors, for his desire to introduce some reason into what seemed to him an absolutely unreasonable performance persisted always, leading him later to make experiments on relative times and motions involved in different types of spelling that finally placed him on the Council of the Simplified Spelling Board and as an advocate of simplified spelling as the work of the engineer.

He did not, all through these years, show any great love for reading, either for novels, poetry or any other kind. This, was due to the fact that the proper books that would hold his attention were never placed in his hands. He did like Walter Scott and other writers of swinging ballads, for rhythm always appealed to him, but he missed throughout these years the guidance and help that the right books could have been. This, not because his household was not adequately supplied with literature and his family a family of readers, but because no one had the least idea that the reason he did not read was simply because the proper books were not brought to his attention. It was only natural to suppose that a lively, active New England boy would prefer out-of-door sports and activity to anything indoors. Yet a natural Quest Maker would surely have delved long and deep into the possibilities suggested by literature, if he had had the least idea that these could have served his purpose.

During the last year of Frank's stay at High School he was, like all boys of his age, perplexed with the question, "What next?" The family, after careful consideration of the matter, united in recommending the Massachusetts Institute of Technology, the "Tech" to which he was always so devoted. He had reported this at the School and was being trained to take the entrance examinations.

He entered a Sunday School class in the Unitarian Church, which his elder sister attended, and was fortunate enough to secure an able teacher. This teacher was greatly interested in the boys and took a personal pleasure in seeing that they made the most of themselves. He found in Frank a congenial spirit and talked with him as to his future, and finally asked him whether he would not consider giving up the plans for entering the Massachusetts Institute of Technology and going into construction business with him, the teacher. He presented the matter in the most attractive form, and Frank, always active, and not at this time extremely studious, was carried away with the idea of putting books aside and going out into the business world.

There were many things to be said for the plan. His mother, as he well knew, had made many sacrifices to provide the education that was her passion. If he went to work at once, he would be able to relieve her of cares much sooner. Going to Technology meant at least four years more, before he could start earning, and probably a period when he could earn but little. On the other hand, here was his teacher offering to take him into a business where he could trace the entire path from his first day at work to the time that he became a member of the firm, or something equivalent.

It is true that the intervening period must be strenuous. In order to become a head man, one of the owners, he must become manager, and in order to be manager he must be superintendent. Of course, a superintendent must have been through foremanship, and a foreman had to be a worker and to pass through apprenticeship. This meant that instead of continuing his "white collar job" of being a student he must put on overalls, and learn not only one but many trades, in order to be able to supervise buildings, bridges and all the other types of construction which this firm handled.

The family was shocked at the thought. Not only to forfeit the prized schooling, but also much of his social position! It would not be easy, should he change his mind, to fit back into his former student life. All plans had been made for his continuing school through "Technology" and this radical step was a source of anxiety and also of the keenest regret.

To all this Frank was sensitive, but he felt absolutely that in the line of construction lay his life's work, and that here was his opportunity.

We find him, then, the summer before he is seventeen, graduating from High School, passing his entrance examinations to the Massachusetts Institute of Technology and deciding to go to work at once. He passed his examinations creditably, and probably furnished quite a little amusement to the examiners. One question read, "Can you name, etc.," and Frank, ever ready to enjoy a joke, answered promptly, briefly and to the point, "I can."

CHAPTER III

THE QUEST BEGINS

What can be more important in a boy's life than his first day at work? This is an experience he never forgets. Long before Frank's schoolmates were putting on their new clothes and departing for Technology with their books under their arms, he was donning a brand new set of overalls and reporting for work as a bricklayer apprentice. His teacher and now employer had decided that bricklaying was the first trade he should learn, as the mason was King of Mechanics.

It was a beautiful, hot July morning. He was just five days past seventeen. The overalls were comfortable. Mother, as always, had provided a bountiful and delicious breakfast and it was good to be swinging along in the open air instead of sitting cramped in a class room. He was happy, too, over certain definite goals ahead. He would be self-supporting at once and soon relieve his mother of all care and responsibility. He would learn as fast as he could, in order to be promoted to another trade and then to the coveted foremanship. He would give his whole mind to the job during working hours, then would fit back among his former associates and enjoy the hours that remained his own one hundred percent.

Ah, here he is at the job and assigned as learner to the star bricklayer! Tom, who is small and wiry and has a twinkling blue eye, greets him cordially and becomes at once a lifelong friend. And he is a friend worth having! Able to chin himself more times than any other man on the job. A voluminous reader of Shakespeare, he does not so much quote his sayings as make his characters a part of his daily life. And Frank is all attention as Tom demonstrates one of the most ancient of crafts. Are scientists as well as teachers born, not made? His case would seem to prove this, for the rapidly growing walls with the bricklayers whistling and joking one another become, to all intents and purposes, a laboratory, and the boy an observer studying minute differences.

He notes that Tom performs his work in three ways. He uses one set of motions when he is working slowly. He uses another set when he is working rapidly, and still a third set when he is demonstrating to his pupil. First comes the demonstration set, as he explains what he does; then he makes some laughing remark to a fellow worker and falls into his slower set of motions. Noting this, and having a natural love of high output he turns to his motions of speed, then switches back to his demonstration motions, when he remembers that he has a pupil to teach.

Like many pupils, this one cannot observe long in silence. He begins to ask questions, and finally the foreman notices this

and informs him that he is there to learn the bricklaying trade, and not to criticise methods. Perhaps Tom has been too sympathetic. He is transferred to another teacher. Here again, the three sets of motions are observed, differing from each other, and all differing from those used by Tom. And so the first day passes, and evening comes. While the boy has not attained any great degree of skill in this first task, he has learned some facts, that, studied and mused over for years, will lead him finally to form his goal in life,—The Quest of The One Best Way.

But oh, the tired boy who went home that night to tumble into his hot bath and fresh clothes and hurry to mother's roast beef. Too tired, perhaps, to try out his program to keep up without deviation the social life of his chums. But sure that he has chosen the right way.

So the days go on. Mother cooperates in every way, waking him at the last possible moment, sending him off with the least possible fatigue, having everything ready when he returns, including that appreciation which is the greatest fatigue eliminator.

Gradually the fatigue grows less, and he is able to keep up easily his standards of dress and social life. He adds night school to his other activities and studies there mechanical drawing and the other things that are needed to add to his equipment for his work, or to supplement the lack of training there.

The two sisters, one now progressing splendidly with her music and the other gradually finding her life work in science, especially botany, see to it that he does not lack for culture. Even a younger brother is a valuable escort. Their activities, amusements and companions do not always interest him passionately, but mother sees that he does his duty, though it is years before he realizes that all the benefits that accrue are not confined to the sisters whom he squires.

He buys his first bicycle, and then every new bicycle as it comes in. He becomes so proficient that the dealers are glad to have him "trade in" his old models for new ones, in order that he may demonstrate their good points. He becomes a devotee of canoeing and a constant attendant at the theaters. In those days it was customary to allow theatrical people to post their advance notices on the walls of buildings under construction, and as he is promoted, more and more of these complimentary tickets come his way.

He is never required to sign apprentice papers or to have to agree to spend the usual three years or other time at the work. He is advanced from one trade to another. He does estimating of cost of work with his employer while still an apprentice. He does railway construction work. He lays stone. He learns many trades until he becomes fingerwise in them, and how to supervise all that have to do with construction. This diverse training is giving him a preparation which he little realizes, both in planning and performing.

He is fortunate in having become a member of an organization that handles many types of work in many places, though these are never far from the center. He lives away from home and has the experience of boarding where the same menu is served three times a day continuously. As promotion comes, he is sent on trips for the firm, always with business as the direct product, but with all sorts of educating experience as by-products.

He is advanced rapidly to foreman and then to superintendent. But this means always added activity as well as added responsibility. At one time for three weeks he is superintendent of one job in the day time, and of another at night, for work is pressing and the supply of supervisors limited. Always mechanically minded and fingerwise, even though promoted where it is not necessary for him to do much himself he takes great pleasure in demonstrating the swiftest motion saving methods of laying brick, or of handling an especially difficult cornice or corner; in devising the best rigging; in designing more efficient scaffolds.

His best scaffold is awarded a prize at the Mechanics Institute. It is based throughout on the idea of functionalizing the work and of saving motions. The hod carriers or tenders have their own platform at the most convenient height. The bricklayers have another platform at the best height for them. This height is relative to the walls, and the scaffold is jacked up as the wall grows, so that the work is done always in the most efficient posture. He is interested always in the economical use of material, but even more interested in the economical use of effort, and begins even in these early days to lay stress on the human element and on the management of men. The scaffold is typical of this. It provides in every way for the material, but the main thought is utilizing and conserving the strength of the workers themselves.

In the meantime, he has had the usual accidents of those in hazardous work. He has fallen from the scaffolding of a church and broken both arches and been carried off to enjoy his first hospital experience in the period of recovery.

One of his chums during these ten years is a young medical student who takes him with him through many hospitals and discusses with him hospital practice and methods in surgery. Operating rooms furnish a fruitful laboratory for study of methods, and he decides that the surgeon is the poorest of mechanics. What is being done? Why? How?—and then, How could it all be done better? What would be The One Best Way for performing this work? Perhaps he does not formulate these questions definitely in his mind, but it is very evident that they actuate his actions, whether in work or in play.

From many standpoints life is eminently satisfactory. Home life is perfection. He has even acquired the large easy chair he coveted, and is allowed to sleep there instead of in his bed if

he prefers. This is the acme of luxury. His boundless health and rugged constitution, inherited from generations of healthy, hard-working, deep breathing ancestors, allow him to work like a fiend and play strenuously. The work that he has chosen is satisfactory also. He likes every part of it, and revels in the contact with many people of many kinds. His fond family probably regret the fact that Frank must spend so many hours of the day with people many of whom are lacking in education and culture. Probably he himself does not realize that he is getting just that training, just those contacts which are absolutely essential to success in management,—a treasure that many of those who come into management without experience as a worker among workers never can attain. Among those whom he meets are the skilled New England mechanics whose like never was and perhaps never will be again; the witty Irish whose whole slant on life is so entertaining that it is a joy and stimulant to all who are near them, and all the others who comprise the workers of that time.

Like the others, he joins the Union and carries his card proudly. He comes to understand the reasons for Unionism and what it means in the life of the working man. He comes to know first hand the problems of the worker; the shortage of work; the tragedy of continued bad weather; the awful prospect of winter coming on and the joy when one can anticipate "two summers with only one winter between." He sees the ambition too, and the desire to free one's children of the care one has experienced and to give them wider opportunities, and above all, a better education to help them use them.

The one source of dissatisfaction is the feeling that he is not his own boss, and that, rapid as his advancement has been compared to the usual advancement, it still does not in any way meet his expectations or his desires. As the first ten years in business draw to a close, he feels more and more his handicap of having to follow other peoples' decisions rather than to make his own. He talks with his employers and finds them not yet willing to admit him to be one of those by whom the decisions are made. So, though he is chief superintendent and has every opportunity, he decides that it will be well for him to start in for himself.

It is a momentous decision for a young man of twenty-seven, highly skilled and experienced in some lines, absolutely inexperienced in many others that have to do with running a large contracting business. The family, as always, encourage him to follow out his ambition, and by April 1, 1895, he has severed his connections on a friendly basis with the firm to whom he has given ten of the best years of his life, and is ready to start in for himself. A significant date, say some who were first his old teachers,—then his fellow-mechanics and who are to become his workers! But he has always a horror of superstition, and, delights in the fact that the new work begins on April Fool's Day!

CHAPTER IV

GETTING THE STRIDE

What can be more exciting than going to work for one's self? to be one's own boss! This is the pet ambition of many of us. The joy of hunting, renting, furnishing and opening an office. The intricacies of hiring one's first stenographer. The profound attention needed to design proper cards, the problems of advertising and securing proper work. The necessity of getting credit, and then materials and men. The thrill of pride at seeing one's name on the door, and the feeling that everyone one meets must know that here is a founder of a new business enterprise in the great city of Boston!

All of these problems engaged the young man's earnest attention and liveliest interest and he found every branch of the work attractive. He determined to be ready and willing to undertake any work offered, but to specialize wherever there seemed to be need. For example, along the line of waterproofing cellars. He got out a calendar showing the high tides for the entire year, and added the slogan, "HIGH TIDES MAKE CELLARS WET,—WE MAKE THEM DRY." He studied his own advertising and that of others and carried on an advertising campaign that increased as the years went on. He determined to adhere to his practice as apprentice, foreman, and superintendent, to furnish always absolutely the best materials and workmanship; to allow no job to pass his inspection that was not the very best that he could make it in every possible respect. He passed through the usual discouraging experiences of contractors, but contracting was in some respects different in his day from what it is now. His competitors were, like himself, men of American birth. The majority of the workmen were also Americans or skilled mechanics from the northern part of Europe. Contracting work was on a level with other branches of engineering and furnished a field not only for fine workmanship but for initiative and constructive ability.

The inventive tendency in the young man found ample scope for development, and an increasing number of inventions stood under his name in the patent office as bricklaying was supplemented by and finally superseded in many cases by concrete. He invented concrete mixers, conveyors, reinforcement,—everything that had to do with making concrete construction both a science and an art. Perhaps as a result of the inventive study necessary for this, none of his concrete work anywhere ever fell or had to be replaced.

The high standard that he set for himself began to bring results, not only in "repeat orders" from former customers, but in orders for work of every kind all over the country. He came

to realize increasingly that in construction work *speed* is an essential factor;—that the owner who can be sure of the proper type of workmanship at the right cost and at the same time know that he is getting his work in the shortest amount of time possible is very apt to award that work to the man who can furnish him with all these results. “Speed Work,” then, became his slogan, but always speed that implied at the same time a high quality of production.

In order to make sure that the cost would be satisfactory to both owner and contractor, the Cost-Plus-A-Fixed-Sum Contract was designed. This took the question of cost entirely out of the field of discussion, after the costs were once definitely agreed upon and the contract was signed. From that time on the contractor became to all intents and purposes, the representative of the owner, and it was to his advantage as well as that of the owner to secure the best material possible at the lowest rates. This, of course, implied a high type of character in the contractor, who must prefer only work where such a type of character was demanded on both sides.

As the work spread from Montreal to Louisiana and from Maine to California, adequate records became necessary, and progress pictures were developed. Daily or weekly on every job photographic records were taken and sent to the main office, in order that the young chief might keep in touch with the work everywhere.

These were supplemented by “Daily Letters,” and by a growing set of forms, each one in duplicate, triplicate or other multiple, in order that job, office and main office might keep in close touch with the situation. These forms received the intensive study of everyone in the entire organization, until they came to be recognized as adequately serving every purpose demanded. While at the time many of them were designed all the underlying laws and principles of motion study were not in their present form, nevertheless, there was a more or less unconscious understanding of these laws, and the forms stand up surprisingly well when motion studied by the most scientific methods.

Not only did the locations of the various jobs expand geographically until England was included, and until the concrete mixer was used practically all over the world, but the type of work undertaken increased in variety and multiplicity. Dams, canals, houses, factory buildings, industrial establishments of all sorts,—these came to be every day affairs. Whole towns, such as that of Woodland, Maine, were constructed. Mills were designed as well as constructed and not turned over to the owner until the equipment was in place and ready for use.

Of course it may be taken for granted that such expansive and intensive work demanded a system. For a long time this was oral. In fact, it was not until Frank met “Billy” McElwain

of the famous shoe company and talked with him concerning systems that he was made to realize that no system that was not in writing was worthy the name. This suggestion of Mr. McElwain's impressed him at once as of supreme importance, and he determined to reduce all practice to writing at once. This was done by asking every member of the organization to write out exactly what he did, and exactly what he recommended as office or job practice. The young chief reviewed this material, and found that it required endless supplementing from his own experience. This he supplied, and as a result "Field System," the first book, appeared. There was no attempt to put this into any sort of literary form. The same rules that had governed his office correspondence and advertising held here. Such rules as his sister had supplied,—“Use short sentences,”—exactly the same things that had been found to appeal to possible customers were now used in the System to appeal to the men who were to read and to follow the rules. These proved the ablest critics, since they knew the work that the rules covered.

This "Field System," written over twenty years ago, furnishes interesting reading today, especially to the trained psychologist, as it reflects clearly the mental processes of the man who wrote it. It reflects also the mental capacity and processes of the men for whom it was designed. It is especially interesting to note how often the reason is included with the rule,—the first principle in good teaching.

The young contractor was fortunate in being able to do his work in an age of progress and much of it for progressive organizations. For example, he did work and then repeat orders for Yale & Towne, and studied their methods carefully. He learned here much of the value of the Suggestion System in writing, and found that adding theirs to his own brought a much better result.

Many trips abroad and visitors from the other side added friends and vision to the young man's experience. His oldest sister who had studied abroad returned to this country to teach and later to marry and settle in Providence, founding a Music School there which was destined to grow into a power among New England culture centers. She and her husband both proved valuable critics of Frank's early efforts at advertising and formulating his system, and furnished his second home, and a lively young nephew and niece to enjoy his visits.

The second sister, Mary, was devoting herself to botany and making noteworthy contribution in a classification of plants according to their methods of disseminating seeds. She studied both at the Massachusetts Institute of Technology and Radcliffe, and when she died suddenly, after an all too short life, donated her collection and teachings to the Library there. Her death was a shock and grief to the entire family group and a loss that has

been felt always since. She would have been a constant stimulus to research and investigation, through ambition for higher education! While the present generation does not realize its loss, the older ones in the family still feel that Aunt Mary could have done much for the children that no one else can do. To her mother, her brother and sister, and other relatives, she was always the "flower of the family."

With both sisters gone, the happy little home still went on,—the young man with his "duplicate mothers" whose chief joy and activities in life were making him happy. It was a charming home, hung with Aunt Caroline's paintings, among them the one that had been exhibited at the Paris Salon. It had a piano for Anne when she came to enrich their lives with music. Frank himself had been the one pupil on record with whom she had not succeeded,—probably because their temperaments were too similar. It was in this home that the girl he was to marry first saw him among his own people. A family idol, waited on by inches, never asked to raise a finger, from whom all household problems or complexities were carefully concealed, who found always a smiling welcome, a bountifully spread table, keen admiration.

The lines of work he had undertaken were most interesting. He had developed,—and now was consultant *to* the owner, rather than contractor *for* the owner. He had had for years an office in London, at 29 Victoria Street near Westminster Abbey, and had succeeded in getting on both the Admiralty and Army lists. He had also been consultant to Major Smith S. Leach of our Army on fortifications on the New England coast. He had continued his investigations into hospital practice. He had visited his own and other's work, in all parts of the country and was acting as constructor and expert on sites and building plans for many of the most prominent engineers in the country. His work brought him in contact with such men as Prof. Johnson of Harvard—and "Lewis" and "Grace" became lifelong friends. He had become a member of the American Society of Mechanical Engineers, and the Knights Templars and affiliated with all the activities of his work and the trades that it represented in Boston.

It was interesting to the girl to see the town and its environments through his eyes; to learn of strength of materials and the problems of construction; to watch the skill of the workers of different trades, down in the foundation, in the super-structure or high up on the scaffolding. It was fascinating to watch the skill of the expert make bricklaying an intricate art, or of the stone mason studying and fitting his stones with that love of the craft that led more than one to sacrifice the skin of his finger rather than bruise his stone, because the finger would grow a new skin, but the stone, once injured, would stay spoiled forever.

The interest in methods of work and the passion for finding The One Best Way of doing it that had come to him on his first day, grew stronger and more dominant, and it had much to feed upon, for opportunities for observing workmanship in different trades and crafts in different parts of the country and with different types of workers were practically limitless. The small organization of the young man starting to work had grown into a large organization, both of field and of office people, cost men, advertising men, engineers, office managers, men out on the jobs. The problems of handling these were opportunities for finding The One Best Way. The goal was formulating itself, though the path to it was not yet clear.

CHAPTER V

UPHILL AND DOWN

In laying out his life's plan Frank had decided among other things that in all likelihood he would not marry. He knew that he had set himself a difficult goal, and felt that he would be loathe to ask any girl to share his problems and to work as hard as he knew it would be necessary to work in order to attain the things that he desired. Besides, why marry when his home life was so ideal? That must remain undisturbed, whatever else happened. However, he changed his mind, as even Quest Makers do, and made two trips, one to become engaged, the second, married.

Of course, it was to be a One Best Marriage, as all marriages are,—but this one started with a survey of qualifications, aptitudes, training and education, and with all sorts of recommendations for future betterment, which were amusing even to the two people involved, but which proved of great service. The new Mrs. Gilbreth was astounded and rather humiliated to learn during her engagement, through the instruction of a mischievous cousin who supplied technical magazines and much information concerning the science of engineering, that there existed a whole body of literature and field of work of which she knew not even the vocabulary. She was encouraged, however, to find that she was considered not only a possible but promising pupil, and might enter at once upon a strenuous and diligently directed course of instruction.

The bridegroom was also adequately informed as to his limitations and persuaded to enter more thoroughly and seriously into the task of reducing all his methods to writing, which was to become, if that were possible, of literary as well as scientific value. The One Best Marriage was to be secured through The One Best Way. That is, through analyzing other successful marriages and synthesizing the result into a plan for this one.

Fortunately, both loved work and were ambitious, and the bride, herself descended on both sides from races of Quest Makers, found the new Quest that was to be their own as worthwhile and as fascinating as he had always found it. A few days stay at the World's Fair at St. Louis with the opportunity of studying what was being done in many fields in many lands opened out vistas and possibilities of which neither had dreamed. The way ahead was not perfectly clear. There was every indication that for a time at least the road would be rough and winding, up hill and down, but the goal was clear, and they were equally determined to reach it.

Mother and aunt had moved to New York, the apartment was waiting, and the New York office had become with the move "headquarters." Almost more work than could be handled was

at hand, from everywhere and of all types. Frank must be away much of the time, overburdened with work and worry all the time, yet, somewhere, somehow, fit in time to carry on the teaching and the writing that he had promised.

The next piece of writing to be undertaken was "Concrete System," and this served many purposes admirably. Like "Field System," it consisted of the working practice of the organization, which through the writing of the book was put in better shape. The art of concrete construction was new and intensely interesting to all those engaged in construction at that time. Success meant not only acquaintance with all literature on the subject but keeping in touch with existing practice and with every advance, and if success were to be permanent, keeping just a little bit ahead of the game.

This work demanded the use of that inventive faculty which Frank possessed and greatly enjoyed exercising. He invented concrete mixers to supplement the early gravity concrete mixer. He also invented methods of conveying concrete and reinforcement of various types. These were used successfully in different types of construction throughout the country. Many, in fact most of the methods and devices were carefully patented, but the inventions were copied and the patents infringed to a surprising degree. Some of the infringements were followed up, but there were so many other types of work, and the art was advancing so rapidly that it was impossible to follow them all, although this could, perhaps, have proved highly profitable if Frank had been willing to devote his time exclusively to such work rather than to new inventions and the application of inventions in the field.

The book "Concrete System" is an admirable record not only of the practice of the organization, but of the state of the art. While this has developed enormously since that time, the book still has value and will have historical value always. It presents not only practice in concrete construction but in building construction of the time and is an admirable illustration of the ways in which buildings of many types were handled with enormous speed at a great distance from the home office by a functionalized corps of efficient workers.

Both in "Concrete System" and in the earlier "Field System" it is possible to trace the beginning of the laboratory idea, that is, of making all tests in such a thorough manner that the results not only provide the proper type of material for the work in hand but a gradually standardized type of material for future use.

We note also in these books the beginning of the laboratory method as applied to the human element and of that standardization which was later to develop into superstandardization through the Quest of The One Best Way. It happened at the particular time that Frank thought his chief emphasis was on the choice

and purchasing of materials and on their proper handling, in fact on every element that had to do with making the finished structure a piece of construction fit to endure. All such tests were adequately passed, for not one piece of construction of any type was ever condemned or has ever fallen down since its erection. In fact many have long passed the time limit that the builder himself set for them and are still in effective and safe use.

Unconsciously to himself, more or less, there was coming into his work the systematic and finally the scientific handling of the human element, which is really so much more important in getting the results desired.

While studying this newest type of construction, Frank's passion for finding differences, and his wife's for finding likenesses, brought about a comparison of concrete work with bricklaying, that oldest of the construction sciences. Gradually everything that had to do with bricklaying began to arrange itself into a plan of a new book to be called "Bricklaying System." Never was any work undertaken with more joy or proved a greater satisfaction from start to finish! A publisher was at hand almost before the material was ready. A careful survey of The Library showed that little literature existed, and that that could be easily mastered by a trained reader, although but a small amount was of much use to the apprentice bricklayer for whom the book was primarily designed.

Frank's own experience in doing a day's work at bricklaying lent an added interest to the subject, and his well stored mind supplied almost more material than could be used. This was supplemented by long summer Sundays spent either in New York or on some job or wherever they happened to be, studying and making records of bond. Never were evenings set aside or engagements kept so carefully for the opera, theater or other pleasures as were the evenings to review the bond charts, first as rough sketches and later as galley and as finished page proof. Never was box of candy or flowers received with such enthusiasm as the large rolls that the young builder brought home in the evening. Never was honor guest more eagerly expected or cordially welcomed than the representative of the publisher who called to cooperate on the work. And finally when the first completed copy of "Bricklaying System" came off the press, it was read, criticised and placed on the waiting shelf with that feeling of permanent satisfaction only a long, difficult and strenuous task accomplished can produce.

While the book was nearing completion, another one was in hand, named "Cost Reducing System." Working on this furnished an even more fascinating task than had been furnished by "Bricklaying System," although it was not designed primarily for publication, and in fact, never was published, as it was felt not only that it embodied the confidential practice of the organiza-

tion as far as handling its corps was concerned, but also that it was so constantly changing and improving that it was really too transitive to be put into type. A review of this, years after, shows it to be working practice that conforms with rules or principles that hold good today as they did then.

It opens, "The great problem before the industrial world today is to eliminate waste, conserve ability and reduce costs," and it goes on to outline how this can be done. First, through increasing output by proper selection of men, equipment, materials and methods. Second, through the establishment of a cost reducing department with a careful outline of the work of all the men under this department, and third, through an adequate planning department. It concludes with a description of the products and by-products of cost reducing work.

It was felt by the young writers that this was too ambitious, too new and too growing an undertaking to publish. They did, however, decide to elaborate one chapter or department in "Bricklaying System" into a book which was to be called "Motion Study", and to include some of the ideas of "Cost Reducing System" in this book. There is a chapter in "Bricklaying System" which outlines very carefully the motions to be used in doing the work, even showing the feet of the worker in the proper position to obtain the best results. This attracted the attention of Mr. Harwood Frost of "The Engineering News" who recommended its elaboration.

The underlying aim and thought in "Motion Study" was to increase the efficiency of the worker. There was a long debate as to whether the examples to be used should be drawn from many fields of activity, or should confine themselves to the field of bricklaying. The latter was finally decided upon, in order to insure unification and continuity, and to fit the book into its proper place with relation to "Bricklaying System", and other books that were to follow. It was decided to make the book short and to furnish rather thought detonators than any extended elaboration of the subject.

Throughout the writing of the books and in their entire work, the writers were seeking for The One Best Way of setting forth what they believed to be the underlying principles of effectiveness in work. Here, as in "Cost Reducing System," were considered the worker, his surroundings, his equipment and tools, and his motions. There was much debate as to how these should be divided. It was finally decided to take them up as *variables* of the work. Only such variables were listed as had actually been found to be of permanent importance in carrying out the work, and the short list was used as a basis for adding further variables and a wealth of examples.

During this time one small daughter had been added to the family group in New York, another in San Francisco, a third in

New York and the family had moved to Plainfield, New Jersey, where a small daughter and a son were born. Grandmother remained a part of the family, but Aunt Caroline, who had taken the trip to San Francisco had died after her return.

The year in San Francisco proved interesting in many ways. It furnished a wonderful time of contact and association with the California relatives. They had been away during the great earthquake and the fire, which was the reason for the young contractor moving there in order to help in reconstruction work, but returned shortly afterwards to find only slight damages to the homestead, including the destruction of a chimney.

Frank happened over one day while the bricklayers were rebuilding this and amused himself by telling them that he felt sure the work they were doing was so easy that he could do it himself. Knowing the amount of skill necessary to lay a brick they laughed at him, whereupon he offered to lay a few bricks to show them how easy the work was. He no sooner had taken up one brick and tossed it in his hand when they said, "It's many a time you've done this before," and refused to hand over the necessary trowel and mortar.

The young man found it necessary to travel from one end of the country to the other almost incessantly, but in spite of this fact, put up many creditable buildings in San Francisco, made intensive study of the effects of earthquakes and fires and decided that while life in the West offered many pleasures and opportunities, life in the East was The One Best Way for that special family group.

Mother and Aunt longed for the East, and the company of the daughter and niece who had been not only child but chum all her life, the two small girls were strong and well and able to stand travel and change. The year in California had always been regarded as an experiment and not as a definite move. So the little house with the garden out near the park, with the long happy Sunday trips across the bay to the family, and back again over the long wharf, were given up for an experiment on The Drive,—near the office; near the Engineering Library, and the technical meetings, within a day of most of the work and telephone call of the publishers.

New York proved ideal as a workplace, and as a living place for grown people, but it was not The One Best Place to bring up children. That seemed to be in the suburbs. Plainfield, New Jersey, furnished a wonderful home. Welcoming neighbors, who developed into lifelong friends; nearness to New York and the office and the railroad terminal so necessary; no distraction of theaters or other amusements, since New York was so near; all the stimulus of the Metropolis; all the quiet of a little peaceful street in a little peaceful suburb.

Here were spent some of the happiest and some of the saddest days. The small boy's coming so eagerly awaited was a joy to the family and the entire community which reproduced the rejoicing when his father came. The awful shock of the going of the second daughter changed every aspect of life.

There came at this time not a halt in activities, for these went on as before, but a period of considering the way that was to come. Days of counsel, of considering what had been done, of analyzing it and attempting to draw from it plans for the whole of the future. These must be gone into in some detail if the Quest is to be thoroughly understood, but before going into them it is necessary to take some account of the meetings thus far along the way, of significant encounters, in order that all elements that have to do with this review and the consequent program may be understood.

Up to this time, while Frank had dimly understood that he was engaged in a Quest, that he was devoting his life to finding what should be for him a One Best Way of living, he had not formulated this One Best Way so definitely as to be sure whence the Quest led. He knew, of course, that for him life meant activity; that he loved and enjoyed it; that he would succeed not only in accomplishing things but in getting permanent satisfactions out of them if he worked continuously and to the utmost of his capacity. He knew also that he loved building, in its larger sense of construction,—building *things*, building *men*, building *books*. He knew that he demanded a large scope for his activities,—diversity of time, of place, of activity, of contact. He knew also, more or less, that he enjoyed people of different types, but all people of very positive tastes and quality. He knew also that he liked learning, though perhaps he was not conscious that he enjoyed this in almost any field if he could see its relationship to the chief interests of his life, or if the teacher was interested in what he was teaching.

He did not perhaps recognize so clearly that he enjoyed teaching and that he had rare possibilities as a teacher himself. He had, however, started to teach his children as soon as they came, and especially to make them interested in everything. Fortunately, all who came during this period and were to follow, were mentally, physically and morally normal. Coming on both sides from a long line of large families of strong, well, vigorous, interested ancestors, they naturally came into a heritage of similar qualities. They possessed also that other great endowment for a child, besides abounding physical and mental health, and that is they were much desired and eagerly welcomed, not only as part of the family and clan group, but as working members of the little group of Quest Makers to which their father and mother belonged.

CHAPTER VI

SIGNIFICANT MEETINGS

In earlier chapters of this account, we have mentioned and described different people who had an important effect on the boy and the young man's life. Such were his grandfather and his father, his Sunday School teacher and Tom, who gave him instructions on his first day at work, and often later.

During the period we have just outlined, he met certain people, many of them in the field of scientific management, who were to influence his whole life, and to make clear the definite direction in which a successful Quest would lie for him. The one who perhaps in many ways meant more to him than any other was James Mapes Dodge, President of the Link Belt Company, and at the time he met him, President also of the American Society of Mechanical Engineers. He was the first of a long list of men in that Society who were to mean much in the young man's life. The work of Mr. Dodge at The Link Belt Company, in "the Society" and in other fields where his activities sent him, was well known to every young engineer, and it was with much pleasure that the young couple looked forward to meeting Mr. Dodge and his wife also, at the Winter engineering meetings. He was seen first on the platform delivering his presidential address and welcoming his successor. Then, near at hand standing with his wife at the head of the receiving line of the reception. Both such genial, unaffected, ideal hosts, enjoying and giving enjoyment to the large company assembled. Handsome, beautifully dressed, gracious, poised, distinguished!

Mrs. Dodge made it her special business to see that the strangers were properly welcomed and entertained, and will always remain in the loving memory of the writer along with a group of other women, many of whom have now passed on,—Mrs. Leland, Mrs. Jesse Smith, Mrs. Swasey, Mrs. Williston.

Mr. Dodge became at once Frank's ideal of an engineer and a man, and always remained so. A man of great breadth of reading and of knowledge, an authority in engineering fields, a fluent writer and witty speaker, above all a lover of art and a skillful handler of all mankind, he stood as an ideal manager and the foremost exponent of the human element in the new movement of scientific management. Through him The Link Belt Company became not only a show place for the technic of management, but a model on the human side. His Weekly Letters; his "Drunk Gang"; his personal contact with everybody in the plant; his insistence on an open door to foreign and home visitors alike, to teacher and pupil, to competitor and co-operator,—this made him a distinct and unique character in progressive industry.

Another group who served as a stimulus to the young engineer were William and Mrs. Kent. Mr. Kent was also an example of the men of the genial, broadminded, experienced older school of mechanical engineers. Able to discuss every topic in his voluminous handbook authoritatively and intelligently, and ready and glad to impart instruction to all desiring information. He and Mrs. Kent were a center of attraction for old and young wherever they appeared, and their two young sons, trained mechanical engineers, were entering the field of scientific management with the best possible preparation.

During these years also, Frank came in contact with Calvin Rice, the Secretary of the American Society of Mechanical Engineers, who was to become a life long friend and valued advisor. He met also, Conrad Lauer of Philadelphia, at this time one of The Link Belt men, and profited much by his sane judgment and buoyant attitude. It was Mr. Lauer who introduced him to Frederick W. Taylor in the Engineers' Building near that wonderful letter of Andrew Carnegie giving the building to the four founder societies.

Mr. Taylor at this time had already given up the practice of engineering and was doing consulting work and giving his advice to all those interested in the movement. He struck one at first glance as a powerful and directing influence, working through other men as well as himself. He was looked up to unquestioningly as leader by those on his staff,—Barth, Cooke, Hathaway and others, who came to feel that, when he had spoken, the last word on any possible matter had been said. His was a face that reflected many moods. The eyes, keen and penetrating; the lips, thin and tightly closed when he was presenting an argument or meeting opposition. The most genial conversationalist in a sympathetic audience.

In the group also was often to be found Henry L. Gantt, affectionately called "Father." He with his wife were both to become intimate friends of Frank and his wife. Mr. Gantt also had an enthusiastic following, led by young men in his organization, but there was here much of the attitude of conference and of a willingness to understand, and attempt to conciliate opposition rather than to fight it. Mrs. Gantt, with her wonderful sense of humor, her keen interest in everything pertaining to her husband's work, her large circle of adoring friends and her interest in the arts made her home a center for both business and personal friends drawn from many fields.

It was during these years also that Frank met Harrington and Mrs. Emerson. Emerson, the philosopher, the traveler, the man of many experiences whose books are valuable from a management standpoint, and who, with his wife, furnished an international background and contact of great value to any group.

He also came to know Wilfred Lewis, the President of The Tabor Manufacturing Company, Taylor's star application of his methods. Endowed with all the Quaker determination and Quaker quietness, Lewis was an ideal maintainer, as interested in scientific management, but carrying out his own interpretations in his own way. He met John Bancroft and his wife, Beulah---dear friends, both gone now. In company, John Bancroft was very quiet, and Beulah did the talking for both of them. She was admirably able to do this,—a trained musician, a wonderful singer, a student not only of literature but of rhetoric, a lover of art and of people, with a wit all her own. She was well able to be the center of the liveliest of circles. In their charming home, a second home to those they loved, "J. B." expanded and led one into field of engineering and science, where he trod familiar paths unknown to most of the world. Beulah talked here too and held her own on every subject, and was especially happy in poking good natured fun at her friends' idiosyncracies of speech, but she was glad to be silent when John cared to speak. Philadelphia has never been the same since the hospitable old home of the Bancrofts is closed!

Meeting these people had not only a stimulating but an enormously important constructive effect on Frank's life. He admired all of them. He loved many of them. He compared their work with his, and their methods with his. He attempted to outline their Quests and to see in what way his was different and how similar, and how knowing what they had to teach might alter his Quest as it went on.

These people were seeing a great deal of each other at this time, because of the fact that scientific management was coming before the public, especially in the rate hearings of the railroads. Mr. Brandies, that wonderful philanthropic mind that has given of its best, at no cost, to public affairs, had offered to appear for the people, and had decided to present as one of his arguments, the possibilities of saving through the introduction of this new science of management. In order to further his work, meetings of those interested were being held and the material was being put freely at his disposal. Small feuds were forgotten; ancient friendships revived; new members were being admitted into the cult, everything in the field that could be used to further the cause was being gathered together and prepared so that it could be best utilized.

Frank plunged into this wholeheartedly. He made himself thoroughly acquainted with the literature. In fact, so thoroughly that he could place almost any reference to Shop Management and other classics without looking at the books. While keeping up his own work, he made time for conferences with the leaders never forgetting that his "pupil" should be included in all these whenever possible.

Before this period, Taylor had started holding meetings at his house. These took the form not of conferences but rather of lectures by Taylor himself, followed by questions. The guests at the meetings were of all types,—foreigners anxious to gain knowledge of this new science of management; teachers in the colleges; men engaged in industry desirous of adapting the principles to their work; installers of systems, old men and young men, with an occasional woman. Each one with his own problem, many attempting to translate an unfamiliar vocabulary into his own language to meet his own needs.

The company assembled in the early morning, in the beautiful large living room at "Boxly" to be greeted by Taylor and often by his two young sons. Pads of paper and pencils were distributed, as Taylor very much objected to interruption. The lecture lasted from two hours on, then followed the time of questions, then luncheon, usually down town, and a visit to one of the plants where scientific management in its perfected form had been installed, usually The Tabor Manufacturing Company.

Practically the same lecture seemed to be given each time, and it was also the lecture that Taylor gave when he spoke away from home, varying only in the illustrations chosen. This is the material that was expanded into "Principles of Scientific Management," but no matter how often it was heard, it was always interesting and stimulating and showed a progressive viewpoint.

Frank and his wife attended several of these lectures at Boxly, and also every other lecture that Taylor gave that it was possible for them to reach. Frank himself enjoyed many personal conferences and by these was supplemented his most careful reading of Taylor's writings. The results of this experience were very interesting. They served chiefly to him as a new method of measuring his own achievements in introducing better management into his own work. He found that much that he had done was paralleled by what Taylor had done, and that Taylor's method of *timing how long it takes to do work* was new to him, while his method of *studying motions as a part of better methods leading to The One Best Way to Do Work* was new to Taylor.

His conferences and increasing friendship with Gantt also showed likenesses and differences in their work. Both estimated very highly the handling of the human element efficiently, and the necessity of understanding the viewpoint of those *with* whom one works, or *for* whom one works, thoroughly, if any progress was to be made. Gantt, however, showed a very strong interest in the economic side, and the desire to investigate all economic theories and to fit his own into its proper place. He did not show such a passion for scientific investigation of the minutiae of motions. But in spite of these differences in emphasis as to along which lines investigations might most profitably lie, the two conferred and worked together with most fortunate results.

We have already mentioned the conferences being held because of the rate hearing. These did much to stimulate the minds of everyone. A typical conference was that which was held at the rooms of Mr. Gantt, then stopping at a hotel in New York, where Gantt, Dodge, Kent, Gilbreth and Brandies met to discuss problems. It was at this time that the need for naming the new science was felt, and such terms as "The Taylor System," "Functional Management," and "Scientific Management" were discussed. Brandies decided upon "Scientific Management," which really he felt would have the greatest popular understanding and appeal.

Through their frequent conversations, Mr. Taylor had come to feel that Frank's work readily exemplified scientific management, although it had been done without the direction of Taylor or contact with his direct disciples, and along slightly different lines. It was for this reason that he included an account of the work of bricklaying in his "Principles of Scientific Management," and often asked Frank to substitute for him as a speaker at meetings, and requested him to answer the questions that his article in the American Magazine raised.

He also became much interested in the plan for "Bricklaying System," and made an offer that he and Sanford E. Thompson should cooperate with Frank in writing a book on bricklaying. This seemed a most flattering, and in many ways, a desirable offer and was most carefully considered, but Frank and his wife finally decided that they preferred to issue their book alone, both because it would then serve its original purpose as an actual system for their organization and because it embodied their viewpoint and their aspirations. This was a most serious decision to come to, because it meant or implicitly implied that they had decided to "go it alone" rather than to line up as part of the Taylor organization and as followers of his method. It would be very difficult for anyone to realize at this time just exactly what that meant, when to be an affiliate of Taylor in any way was a great honor and gave one a certain stamp, and also often meant that desirable work was turned over for installation.

The combination of all these things at this time led to what was really a parting of the ways, in more sense than one.

The frightful ravages made in the household through the diphtheria which took one little girl, and attacked another, made it desirable to move away from Plainfield, in many respects such an attractive living place. The growing realization that their best work lay in the field of handling the human element; the feeling that contracting, rather than rising, was failing to hold its own in the professional scale, while management engineering, the new profession, was bound to rise in importance and dignity; the constant realization that the Quest of The One Best Way was their life work, and that this could be followed better in the field

of management than in the construction field,—all these and many other things led to the decision to leave the contracting field and to enter into the new profession of management engineering.

This implied many things. It meant a great sacrifice in abandoning the field where their work was acknowledged as pre-eminent. It meant a protracted learning period, for in spite of excellent preparation in many ways, they realized deficiencies. The most important of these was in the line of intensive, growing knowledge of education and psychology. This latter feeling had persisted for some time, and was brought home to them on attending the Dartmouth Conference and noting how lacking even many of the best presentations were in any knowledge or recognition of what teaching and the sciences that underlay it should mean in successful management.

They had outlined and written "The Psychology of Management," which was submitted by the wife as a thesis at the University of California and accepted. The doctor's degree was not conferred because at the last moment the Academic Senate felt that it should not break a precedent by omitting the requirement of a final year of residence, and therefore, it was made practically impossible for her to take the necessary examination.

While the thesis was accepted by the Academic audience, it did not receive the same ready acceptance from others. This included the publishers, for it traveled from one publisher to another in New York, Boston, Philadelphia, and wherever prominent publishers were to be found, and in every case was refused as "ahead of its time," and "likely to interest only a few readers."

Not daunted by this, the young couple were sure that psychology and education were fundamentals of management, and important factors to be considered in making their decision.

It was really a critical consideration, for there was so little competent counsel that could be taken. The family were interested and cooperative as always and willing to abide by whatever course of action was decided upon, but the way looked hard and hazardous. Meantime, a cooperative client for the new undertaking was found in John G. Aldrich, at that time Vice-President and General Manager of The New England Butt Company.

Now the acid test was applied to the whole matter, namely, the parallel column, which they found had always been of the greatest assistance in their life. Was it not Benjamin Franklin who first used the parallel column, or at least whose use is first recorded? At any rate, in one column are placed all the advantages of any proposed plan, and in another, all disadvantages, and when these have been carefully listed, weighted and weighed, the decision is made as the result of the most accurate measure-

ment available. This seemed The One Best Way to attack the problem, and it was attacked in this fashion, and the result was that the new path should be taken.

It involved many things. First, moving to Providence, which was in many ways an excellent place to live. It was the home of Frank's only living sister and her family. It was the location of The New England Butt Company, the factory of a new client, which would enable Frank to spend much time there, and the wife to see this initial work from day to day. It was also the location of Brown University, which, upon investigation had proved cooperative in the plan of her taking the last year of attendance for her doctorate there and obtaining the necessary last word information on education and psychology. It was near Boston and New York!

On the other hand, it meant a distance from the head office in New York; it meant revising the decisions that New York or its suburbs was the best place for an engineer to live; it meant giving up many pleasant contacts and educational experience; forming new habits; meeting what was in many respects a new life. But the aim of this life became clear as the discussion went on, and the decision was made. It was to devote all their energy to the science of management; to evaluate their past experience in these terms, and to attempt to conserve and use all of this that was possible; to waste no time in regretting past mistakes or rejoicing in past achievements, but to consider these all as working equipment for the new line of work; to regard the past as a long, winding, and in many respects, hard road, which was now opening into what might prove a narrow, difficult but straight road to The One Best Way to Do Work, namely, analyze the best that you have and go ahead through the best available to the ultimate best existing or to be found.

Serious as the decision was, hazardous as it might have appeared to give up a business that was interesting, worthwhile and stimulating; and discouraging as it might have appeared to start in a new line of work after devoting so many of the best years of their lives to the other field, there was much that was encouraging. Their preparation for the new type of work was excellent. Construction work had offered an admirable field of training in handling the human element, and Frank's earlier experience as superintendent, as foreman and as apprentice had given him an understanding of the attitude of the worker that no book knowledge alone could have supplied. The education and experience which the two engaged in the Quest had pooled, furnished at least a good preliminary training in many fields.

Added to this was the fact that they had learned where to find information and had never given up learning. There existed, too, a passionate desire to succeed, and an appetite for the job

which made what might otherwise have been tedious detail interesting and which made each new problem a challenge. And it was always a joy to work together!

In spite of the fact that diphtheria had wrought such havoc, except for the one great loss the family had come through in excellent health, ready to undertake new difficulties or rejoice in new achievements. The past was to be by no means a closed book. They were determined that failure should teach them to avoid other failures; that lack of success should only serve to help them locate causes of lack of success in their own work or that of their clients, and that every past success, though in a different field, should be transferred into the new field; that things that they had learned from the leaders in scientific management should be incorporated at once into their own theory and working practice, but that nothing,—no matter from what source or apparent value,—should be so incorporated without first having passed the test of accurate measurement, with the most scientific units, methods and devices that they could secure. It is interesting to note that in this careful survey of their past practice they found how true is Huxley's saying that it is always wise to collect information even tho it be far in advance of one's needs. Here was material at hand, which at the time it was collected had apparently been unavailable, but was exactly what would be needed to solve new problems.

It was, then, with a carefully prepared map of the road behind them, and with plans and equipment for surveying and recording the road as they were to come to it that they prepared to move and start the new work.

CHAPTER VII

THE STRAIGHT ROAD

Providence, city of homes and site of Brown University, City of factories that have been in the hands of the same families for generations. Modern commercial center, yet sleepy old fashioned New England town. Interested in every type of progress and activity, yet holding fast to the traditions and customs of the past. Holding somewhere among its population all the types that frequent New York or Chicago, but adding to these the precious old types of New England. The college professor sauntering along reading a book. The New England housewife, able to preside at woman's club or to speak before school or association with poise and ease and equally able to preside over the preserving kettle or direct the ways of her household. The rarest most precious type of all, who still placidly wear their hair parted and drawn simply over their ears; who feel and look their best in crisply laundered sprigged white muslin, with ample white aprons protecting their spotlessness, while they concoct such delectable doughnuts, apple pies and Queen puddings as are to be found nowhere else.

Frank fitted back to perfection into the New England atmosphere during the little time that he could be there, but enjoyed also the numerous trips to New York, Philadelphia and farther afield. To his wife it was the realization of a life-long dream,—to live in New England; to be part of a New England family; to study at a New England college!

Oh, the dignity and repose of "The College on the Hill!" The beautiful elms under which John Marshall, John Hay and Charles Hughes walked; the fine Library; the class rooms, many of them antiquated, but precious for their atmosphere. The men who taught because they loved to teach, and the students who studied because they loved to learn. She saw it all, of course, through rose colored glasses, and spent there the happiest of years.

Psychology with Dr. Delebarre who led his graduate students often into the heights of metaphysics; education with Prof. Jacobs, with all the contacts that came from many fellow students who taught during the week, and tested the theories advanced in class and brought the results back to be discussed. Educational psychology with Dr. Colvin, an advocate of accurate measurement, who preached what he practiced and gave working rules as well as underlying philosophy.

A conference now and then with Dr. Faunce, who had helped outline the plan of work and was always ready with encouragement and interest.

And days of visiting schools!

In spite of his many other activities, Frank took part in all these studies, and they were able to apply what they learned to management problems constantly and to discover what their further needs would be.

The work at The Butt Company proved most stimulating. A small plant, as compared with many others, yet it offered every opportunity for extensive work. The product was braiders that make shoe laces, covering for wires, etc. The officers of the company and the managing force in the plant were splendid New England types,—progressive, interested, and above all, cooperative. The workers, many of them old time New England mechanics, but with enough of other types to allow comparative study, were also cooperative and able.

Frank threw himself into the new type of work wholeheartedly. He delved at it; he thought of it; he dreamed of it. It went with him on his trips, and through his all too few hours of leisure. For it he marshalled all his past experience; for its use he translated the findings of psychology and education so that they became usable for management.

At the Butt Company he conferred with the management; he held meetings for the men; he established a laboratory in the plant for testing individual processes, perfected one laboratory outside the plant and another in his home in order that investigations might go on after hours. He used what he had, and invented new things. He secured from Mr. Taylor and from Mr. Dodge complete records of practice in their plants, and he visited these plants and other plants in order to see what was transferable. He invited visitors from near at hand and from a distance, and obtained and studied their reactions. If ever there was a test installation conducted along lines of laboratory investigations, this was one.

The operation of assembling braiders was chosen for intensive study. The assembly of all those who were rated as skillful was recorded. The braiders themselves were dis-assembled, in order that the process might be studied backwards. The micromotion method and the cyclegraph method were applied, and these methods themselves were perfected and amplified to meet new needs.

Meantime the complete installation of the Taylor System throughout the entire plant was taking place. Every process involved, from the time an order came into the plant to the time the finished product left, was billed and was paid for,—was studied in detail. Then the product was followed backward through the plant, and the results were compared with those in the reverse study.

Finally, as the work proceeded, Mr. Taylor was invited to make a thorough inspection, and he showed himself completely satisfied with the results. For example, he pronounced the tool room the finest he had ever seen.

In order that it might never be necessary to repeat this intensive process in detail, micromotion records of every department and sub-department were taken. The entire Taylor system, as working and as approved, was recorded by the micromotion process, in order that there might exist *for all time* accurate records of the Taylor System for review, study and use.

Even the forms were photographed, and the process of filling out these forms, so that at the conclusion of the recording period, there existed a body of data that never had been gathered together before, and that would be difficult to parallel anywhere at any time.

It must be understood that these data of the Taylor System were supplemented by the micromotion data, the cyclegraph data and all the superstandardization data that were Frank's own original theory and practice.

It must not be thought that the client bore the expense of all such recording and study. The expense borne by him was only that usually borne by a client for installation work, but it was indeed fortunate for Frank that he found in John Aldrich a warm friend and an understanding cooperator, and moreover, one glad to give the results of the investigations first to the profession, through the papers and discussion for the American Society of Mechanical Engineers, and later to everyone, cooperator and competitor alike.

We have spoken of the laboratory in the plant, and of the other laboratories established in Providence. These were the first One Best Way laboratories in existence. Through conducting tests in the plant laboratories, in the plant itself and in the outside laboratories, all possible needs were met and all necessary data collected for an investigation that would meet the requirements of science.

Into the Gilbreth laboratories were brought all sorts of problems of clients, especially of some who did not find it convenient to establish laboratories in their own plants. Here came the speed corps of one of the large typewriting companies who were to be developed into champions. Here came surgeons and nurses, that their processes might be recorded. Here came Walter Camp, Roger Hovey, Gil Nichols, Ouimet and other golf champions, for pioneer records in the field of sports. Here was established the first Fatigue Museum, where fatigue causing and eliminating devices were gathered and exhibited, in order to stimulate interest in this field.

In Providence was started the first "Home Reading Box" movement. The first Home Reading Box in a plant was in The New England Butt Company, and the first in a home in the little house on Brown Street. The work of Frederick E. Cooper in planning the details, as part of his training in scientific management, is not forgotten. The city was divided into districts. House-

holders were urged to keep their magazines. Young men with cars were enlisted to collect these magazines, which were deposited in a box through a window in the plant, that the day's work might not be interrupted. The workers were allowed to take as few or as many as they chose and to keep them or return them.

If anything had been needed to convince Frank and his wife that they had chosen the right work, that they had found the straight road, it was found in the response of the workers to the efforts made to conserve and foster the human element.

Looking backward over the long way, there are few memories more heartening than the human interest ones at The Butt Company. The first day that the chair for heavy filing was used. The enthusiasm of the worker as he tried the little "verandah" where he could rest his foot. His demonstration of it, as he filed standing and then sitting.

The memory of the group of men at the Home Reading Box which included everything from some odd volumes of an old encyclopedia to the Police Gazette. The fathers choosing the home or picture magazines for the wife to read or the children to cut up. Those of a studious turn of mind selecting the trade catalogs that might have some hint as to an invention, or some new idea for the Suggestion System that might win a prize. The young chaps looking for the magazines that held the installment of a serial that they were reading.

The group at the Branch Library that was started with the help of the Public Library and the interest and direction of Mr. Foster, the librarian, and the Italian who carried off and read the "Divine Comedy" as the very first book drawn from the collection.

The group of office people who volunteered to come after hours, in order that their expert methods of handling their work might be recorded without the interruptions of the busy plant life.

The enthusiastic young messenger boys, being taught typing in their odd hours, and reveling in the thrill of contests for promotion.

Visitors' Days! Especially the one when Miss Tarbell came, and went home with one of the older men to see his household, and meet his model mother-in-law and talk over the effects of scientific management upon the workers.

The days when "Old Bill," became an expert of The One Best Way of assembling the braider, demonstrating the packet, the carrier and the two way work table, for a group of engineers, psychologists and other visitors who came to get and give many new slants on the work. And the many days with "Jack" and "Phil" and "Nat" and all the rest ever since.

Meanwhile, life at home went on smoothly. Another boy, another girl, then three more boys joined the group. The older children began to go to school,—Sunday School, Dancing School,

and to start their music with Aunt Anne and her staff of teachers. A piano pounded, a violin squeaked, and later a 'cello roared, after the peaceful school hours, and only patient grandmother rejoiced at the inharmonious sounds. Nothing mattered with her, as long as the children were learning something worthwhile.

The garden was small, but the Brown campus, a block away, was large and green and beautiful. School and neighborhood provided congenial playmates. Dad was away a great deal, but home enough to direct things and to leave carefully worked out plans to be carried through in his absence. They might have part in all the activities not only of the home, but of the business, if they chose; might learn both office routine and laboratory practice; might visit the plants; might observe the experts who came to be studied; might chat with the famous visitors or steal away to be petted by Grandma if the conversation became too unintelligible. They learned, however, to enjoy listening, even to talks that they did not thoroughly understand, and voted, as prize guest of the year, one who had not "talked down" to them, but made them feel part of the conversation.

In spite of the drawbacks of living in Providence,—and there were some,—Frank began to feel, in the phrase of Pres. Benjamin Ide Wheeler, who made many pilgrimages back to his alma mater, Brown, for Commencement, "It is good to be here!"

CHAPTER VIII

THE ROAD GROWS BROADER

During this period every day became more fascinating and more filled with thought absorbing and broadening interests. The work at The New England Butt Company was supplemented by work in many other plants, at different places, and of diversified types of activity. In each case there was not only the installation of the theory and practice of management, but also the application of the laboratory methods of motion study and fatigue study to the various intricate repetitive processes that would best pay for such intensive study. The days and months were too short to accomplish half that the "partners" desired to do.

Nevertheless, they managed to fit in for three years a Summer School of Scientific Management, which was attended by professors of psychology, economics, engineering, and other fields allied to management. This grew out of lectures Frank had given at the various colleges; out of meetings and conferences on industrial and engineering education, and out of a growing feeling that if the young men were to come into industry properly prepared to cooperate in and finally to undertake the new type of management, they must get a more adequate training in the colleges.

The professors were ready and willing to teach all that was necessary, but had not themselves the necessary training or even information. The Summer School was held at 26 Cabot Street, where one of the laboratories was installed, in order that the men might have lectures; do, themselves, some laboratory work and visit The New England Butt Company to see and actually work out the things that they had read or discussed during the lecture and conference hours.

To this Summer School came men from the University of Maine; from the Technical School of Nova Scotia; from the University of Wisconsin; from Brown; from Yale; from Purdue, all widely scattered centers of interest in the newly developed science. Here came to visit such men as Dr. E. E. Southard, head of the Boston Psychopathic Hospital, and Mr. Dodge, on his trips to and from his summer home in Jamestown. Mr. Dodge was at his best talking to such groups, telling stories of the older days in management, giving advice as to the handling of the human element, bringing a breadth of viewpoint and a cheery buoyancy that was all his own. Dr. Myrtelle Canavan, an expert pathologist, was a member of the Third Summer Course, and became one of the most valued of friends. Through her and Dr. Southard came a contact with psychiatry that proved of great value. Dr. Southard later gathered at the Psychopathic Hospital in Boston employment managers, psychologists and others interested and invited Frank and his wife to cooperate

with him in arousing the interest of all those in touch with the problems, in correlating psychiatry and industry. Cases of patients who had been in the industries, on file in the Psychopathic Hospital, were brought out; patients, in the hospital and out, were brought before the group and interviewed, and everything possible was done to discover causes for industrial maladjustment and possible remedies.

Rather to the disappointment of Frank, most of his Summer School pupils, instead of going back into the colleges as he had planned, went into industry. However, in the end this proved profitable, as the majority of them after their industrial experience did finally go back into college work, carrying their enriched experience with them.

In the meantime, there had come the wonderful opportunity to make the trip to Germany with the engineers. During their stay in Plainfield, Frank and his wife had been on the English trip, and had enjoyed very much the contact with English engineers and the opportunity of becoming acquainted with English industry. This trip was to take them through industrial Germany. As on the English trip, the engineers gathered in New York and sailed together on one ship, having a splendid opportunity to renew old friendships and make new ones. Many of those who had taken the first trip took the second one, though the Dodges were prevented because "Uncle Jamie" was taking his doctorate at Stevens. But the Rices, the Gantts and many others, in management and out, went.

Nothing imaginable could have been a more interesting and stimulating trip. Landing in Hamburg, the party visited one industrial town after another, having every opportunity to become well acquainted with German industry, with German engineering, and with German social and home life. The Convention ended at Munich and the party disbanded, returning home each according to his own plans.

During this trip many valuable contacts were made. Not long after returning, Frank received a request to come back to Germany and do consulting work. This he accepted, and as a result spent much of the time during the next few years in the great industrial plants of Germany, teaching, installing, establishing laboratories, and perfecting processes.

It was a wonderfully broadening experience. While much behind America so far as scientific management was concerned, Germany was far in advance in some respects, such as in the economical handling of materials. The German engineers were not only clever technicians, but broadly trained scientific men, and they welcomed Frank not only as a brother engineer but as a friend to be invited to their homes and introduced to their families. In one case the plant where he worked was the leader for the whole world in its special type of organization. The work-

ers were the owners and the stockholders of the company, and living and working in the community was a liberal education in the most advanced type of sociological thought and life.

The trips back and forth gave him chances to study many countries and many people, and even to get up into Scandinavia. He took every opportunity not only to study his life work of industrial engineering, but to study the other things that were interesting to him. Hospital practice; skill in every field; education, industrial and other; the training of children; the elimination of waste; laboratory and industrial psychology. His frequent trips meant that the information was always the last available, and that it was immediately translated into use in the installations in this country, in his teaching of his children, and in his collaboration in various societies and committees and on many types of investigation and work.

It was no small undertaking to teach and install management among a people with whom he had never been intimately acquainted, most of them speaking a language of which he knew little; a people actuated by a different race and industrial psychology, with a passion for advancement and with an overwhelming desire to demonstrate the equal if not superior facility of their people in management, philosophy and technic; a people also with a passion for betterment and invention, who found it often extremely difficult to accept what they were taught without making what they felt to be changes for the better, but changes which often unfitted some special part of the installation from working properly with the rest.

It was all a wonderfully educative experience, and a wonderfully broadening one. Meantime, the war which had seemed for some time imminent, and which Frank had sensed in Germany even before the Germans themselves, broke out.

During the period that this country was not engaged in the war, Frank continued his trips abroad for some time, for several reasons. First of all, his work in Germany was not in plants that had in any way to do with the war, nor was it on equipment or materials used in the war. He felt, therefore, in honor bound to live up to his contracts. In the second place, his contracts involved a considerable sum of money and he felt it not only a personal but a patriotic duty to see that this money was earned, paid and brought back to this country. In the third place, he was enabled to make observations which proved of great value. In the fourth place, as the cripples began to return to Germany and to other countries, he could see the need of and the great importance of the problem of re-educating the crippled soldier. Filled with the desire to do something at once, he and his wife wrote the first paper on the re-education of the crippled soldier

and he was able to help in the international work of re-educating the crippled soldiers, which grew until it became one of the most interesting and worthwhile of all war time activities.

It is astonishing how the Quest of The One Best Way to Do Work holds together diversified activities. How collecting data that have to do with performing any kind of work skillfully means a gradually increasing fund of information that can be transferred from one field to another. This was the case when the new and intensely interesting problems involved in motion study for the handicapped, motion study, fatigue study, hospital study, skill study,—best methods in every field,—presented themselves as possible aids to putting back on the payroll those who had given of their mental and physical strength to their country, of helping them recover that permanent, durable satisfaction that comes from doing one's part in the world's work.

Moreover, there were no problems presented by war cripples that had not been presented by peace time cripples, except that in many cases the problems of mental readjustment were more serious. The new work was furnishing immediate benefits to a group who needed it sorely, but would also give information that would be usable in all times, with all sorts of people who became handicapped through accident or were born that way.

In spite, then, of the dreadful conditions of affairs abroad, the little family group were happy in their home life and in their Quest making. The road not only seemed straight ahead, but was broadening with all the new contacts and opportunities. Then came the day when our own country went into the war, and when again everything was changed for them, as it was for so many million others.

CHAPTER IX

THE WAR WAY

Who that has not lived through an age when his country went to war can realize what it means to have the call to arms sound throughout the land? Not only do the men of fighting age drop everything and run to enlist, and the women and the younger and older men estimate their qualities in terms of war service, but the entire country comes to think in terms of patriotism. Not what is best for me or even for mine, but what is best for the country! Not what can I get, but what can I give! Not where could I choose to go, but where am I needed!

The little household, of course, shared in this feeling. It had only one fighting man to give, and he was sorely needed in the household, and could have found a useful place in an essential industry. It was not only that he felt in his heart the urge to go. He was, for the time, the incarnation of the passionate demand to go; to take his place with the rest; to be a part of the fighting force.

Frank sent a telegram to Washington offering his services, and adding, "If you do not know how you can use me, I will tell you."

He reported for examination and was accepted as Major of Engineers. Then came the great longing to go overseas, and an opportunity to go, in his old line, construction.

But those in power felt that there were others who could do this work as well, and that he was needed most of all to work under the General Staff, finding The One Best Way for the soldier.

It had been planned long before that the little family,—by this time a large family,—should visit the home folks in California for the summer, and it was there that the telegram telling of the Major's commission arrived. Oh, the thrill when the wife and children got back to Chicago and were met by Dad in his Major's uniform. Oh, the pride that they had a soldier of their very own, and in the knowledge soon to follow that every man of fighting age in the family, on both sides, had volunteered for service. Uncles, cousin, father in uniform. No wonder the small boys held their heads high and longed for the day when they too could volunteer.

Frank had before this visited Colonel Owen at the Army Medical Museum in his desire to push the work for the handicapped in this country, and Col. Owen,—counselor, inspirer and friend,—tided him over the difficult period in Washington before he was started on his way to Fort Sill to join Capt. Ellis and Capt. Garey, the West Pointers who, with him, were to study the

training of the soldier, at the School of Arms and the School of Fire at Fort Sill, to record the processes and to formulate The One Best Way.

The work was vitally interesting, and all three threw themselves into it with all the energy at their command. They devoted their days to making records and their nights to studying these, and to pressing forward to reducing the results to training films that might be sent to every camp in the country. They studied the technic of motion pictures as it existed, and developed a new technic of motion pictures as a teaching device. They consulted psychologists and educators; they studied the men who were to view and learn from the films; they experimented with methods of presentation and persuasion. When they found the sergeants rather indifferent, they hinted in captions to the privates, "If you do not understand this, ask your sergeant," with the result that the young non-commissioned officers paid close attention, that they might answer the questions of their men.

With Frank this was not only a case of work, but of overwork. He had put in a more strenuous life than he realized, and the almost twenty-four hour a day schedule, the difficult living conditions, the strange food, and above all, the unpalatable water brought upon him a severe attack of rheumatism, which terminated in a critical attack of uremic poisoning and then pneumonia.

His devoted co-workers and his other army chums did everything that could be done for him and more, and finally telegraphed for his wife to come as soon as possible.

It was not easy to leave the little family, but Grandmother and Aunt Anne rallied nobly as always to the need, and faithful Tom and Mrs. Cunningham, who for years before that and for many years afterward, had taken a part in making the household run smoothly and in bringing up the family, all promised to stand by, and she was speeding across the continent almost as soon as the message was off the wire.

No words can ever describe what she found, or what happened there in that remote army camp, in that poorly equipped hospital. A lack of everything that was needed, from medicines, linens and food to nursing, due not to indifference but to the speed with which it had been necessary to equip the camp and to its distance from centers of supply. At that time, even Red Cross nurses were scarcely available, and private nurses were almost unknown. The first nurse proved uncongenial, and even in his periods of unconsciousness her patient resented her presence, and rebelled against her treatment. After that, however, they were fortunate enough to secure two who stood for all that is finest in that splendid profession. One who refused to give up her work even though suffering cruelly from fallen arches, who was succeeded, when it finally became necessary for her to resign,

by another who regarded the tired wife as well as the frightfully ill husband as a patient, and devoted herself unstintingly. Dear little mother of two boys, now in the far west, nothing will ever make your help and kindness seem less precious!

No words could ever describe the kindnesses of the orderly, Hamilton, who rushed to "my Major" every free moment he could find, and who begged to be relieved of all other work that he might devote himself to the case; who struggled to keep at the nursing, even though suffering himself with the most painful ear trouble, and who could hardly be restrained in his bed in the far pavilion when he felt that his Major might not be receiving the proper attention.

No words could describe the other kindnesses showered upon the lonely wife, struggling to put up a fight where all fighting seemed hopeless. The young brides and grooms at the "married mess" who tried to make her meals cheerful; "Dickey," who cheerfully acted as substitute for seven little boys and girls; the brother officers who were always on hand to help or offer services; the busy doctor who came from the far distant larger base hospital for consultation, and who,—a psychologist as well as a medical man,—invited the wife to the consultation, and after he had seen the patient in her presence not only outlined but asked her cooperation in the further treatment; the authorities of the hospital who not only let her stay with her patient all through the day but have a cot near him at night; the commanding officer who gave her permission to occupy her husband's quarters, and later to have the nurse occupy these, and who, in his thoughtfulness, forbade army airplanes to pass over the hospital during the time of the most critical illness, and offered to stop the Sunday Concerts lest they should disturb the patient. They were not stopped, for she well knew that the patient would prefer to have his fellow sufferers enjoy the usual hour of music, even though it should disturb him.

The little "Y" man,—who had always a word of cheer, as he passed through on his way to the wards with his pockets full of oranges for his "boys." The orderlies, who offered to carry the patient in his bed onto the porch and back, who stopped whatever they were doing as she went through the wards to ask "How is the old timer makin' it today?" The other patients in the wards who had always a message of cheer or a word of encouragement.

No one can write the story of our privates adequately. There was the day when those who had been severely burned in the explosion of a balloon, were brought into the hospital tenderly by their mates to be done up in bandages of cotton, and the Sunday that followed when the fellows of their company came over with such splendid offerings of ice cream that there was enough to feed the entire hospital. There were the days when taps were

sounded outside the window, and a soldier covered with the flag was started west to his last home. And there were the long, long anxious nights!

Well, enough of this. The longest night passed. The most anxious days were over, and at last, after everybody had despaired of his recovery and declared it impossible, the crisis was passed, and Frank began to get well. Just as sunlight is brightest after a storm, so is recovery most joyous after a dreadful illness. There was the day when he asked for his trousers, and insisted that they be hung on the screen in order that he could feel that he would soon be striding about in them as usual. There was the other day when he got them on, and asked when he could go home, and when one of the doctors, hoping to quiet him said, "When you can walk the length of the ward and back," knowing this to be impossible, and then when he, with the spirit of old Daniel, got to his feet, demanded his crutches and walked to the end of the ward and back again, suffering untold agony, almost too weak to make a step, amid an odd silence, down the row of beds and back again, while the astonished doctor gasped, the little nurse fluttered after him and the anxious but proud wife felt that the Frank that she knew was coming back again!

And oh, what a passion he was in to leave Fort Sill, get back to Washington and get back to work. He telegraphed to Col. Owen and the authorities at Washington. He plagued the life out of his doctors. He insisted that all his belongings be packed up and that the quartermaster be notified that he was leaving. He urged the doctor to "cover me up with a blanket and put me on the train, and when we get to Washington lift up the blanket and see what you have."

Finally, the order came and the day of departure was set. Capt. Ellis and Capt. Garey had been ordered back before this and had torn themselves away feeling that they would never see their comrade again. Capt. Sloan was still there, and ready to make the departure as easy as he could. But with all his help and kindness, going was complicated. An early morning visit to the quartermaster found the key lost and there was delay while that was found. The usual attendant at the quarters was away and there was a delay while someone was found who could collect the baggage and dispatch it to the station. Leaving the mess was easy, for the courtly Texan in command not only made all accounting easy but offered to loan money for the trip if that was needed. The quartermaster at the last moment almost refused to sign papers, because he was absolutely sure that the patient had died some time before, therefore, it was impossible that he was alive and being moved.

But at last the difficult transit from hospital to train was made, and the long, slow trip across the continent began. A few moments stop at Oklahoma City to greet the nurse whose feet

were now better and who came to rejoice at her patient's recovery. A longer stop at St. Louis where they bade good-bye to the other little nurse, a glimpse of Frank Sanborn at Columbus, and then on, on East. Poor Hamilton succumbed to his painful ear and crawled into his berth. "His Major" could scarcely move in his, but his spirit soared on high with joy.

They arrived in Washington to find that they were without transfer papers, and that the patient had apparently transferred himself or, worse yet, was listed as dead.

There was some little trouble in gaining admittance to Walter Reed Hospital, but at last this too was accomplished, and though still in bed, he was at least in Washington! The tired wife sank into a chair by his side, and wondered what she should do next, since staying in that hospital was impossible. But friends are raised up for those who need them for a captain in the next bed, whose wife had been visiting him and had returned home, gave her the address where the wife had stayed, and almost before she knew it, a kind government employee and his wife had made a home for her, as they had for so many wives of patients at Walter Reed.

There were flying trips home to see the children, and flying trips back to see the patient. Poor man, life proved harder than he had feared! He did so long to be well; to be sent from the hospital; to be back at work, but this seemed impossible. One doctor after another made examinations and tests, one Board after another took up his case, but in Washington he stayed, and it looked fair to believe that he would be detained indefinitely.

No one will ever know what a help to him his Washington friends were at this time. Especially the Youngers and Col. Owen. John would dash in and carry him off for a home dinner with Muriel and the children. The Army Medical Museum became his home, his workshop, his recreation, his one hope. There he could go at any time. There he could stay. There he could work. There he was welcome and appreciated. Col. Owen and his staff not only welcomed him but let him feel himself and make himself useful, which was the one remedy which he needed. At last the day of mingled joy and sorrow came, when, having been indefinitely refused the opportunity to go back into active service, he was told that he should resign and obtain an honorable discharge from work in line of duty. This he did. Then,—*home!*

What does home look like to one who has been away in hours and miles, and through the greatest of all distances that comes through an almost fatal illness? The green lawn and the restful elms of the campus, after the sand storms, the freezing cold and the scorching winds of Fort Sill. The voices and laughter of the children, in place of military commands and the rumbling of heavy guns as they went out in the morning for military practice.

The baby boy became a companionable playmate. Mother's good doughnuts and apple pies after the monotonous officers' mess.

And after that, the sun and the sand and the peace and the healing of Nantucket, that brought strength where there had been weakness; healing where all experts had said no recovery could ever come; ability to work where work had been impossible; the desire and strength to pursue the Quest when the Quest seemed ended.

It took a long time to get back strength. There were the weeks when friends had to lower him to his sand bed, and haul him carefully up again. There were months when a cane was needed. There was almost a year when he had to go carefully, and think slowly and work slowly. There was a difficult time of taking back responsibility and adjusting himself to the old burdens, but as the strength came, he threw himself more and more back into war work. Work for the handicapped and work in war industries. The work for the handicapped he had never stopped. While he was in the hospital he had been wheeled daily down the long corridors at Walter Reed to watch the reconstruction work and to take part in it, feeling that as an officer he might help make it fashionable among privates for whom it was designed, and to whom at that time it was restricted. And the hours with Col. Owen at the Army Medical Museum where the technic of reconstruction was investigated and formulated.

The work in the essential industry was that in a loading company, the most hazardous of occupations, and this satisfied to some slight degree his desire to be in the danger zone. His consuming passion for being on the other side, for actually being a part of the front line, was never gratified.

But who can regret this. For in the midst of this work came *Armistice Day!*

Peace, first to be celebrated as wildly as any victory, with shouting, hysterical crowds and bizarre demonstrations. Then to be accepted more calmly. Then again, to develop into the wildest enthusiasm as our boys began coming home. Then to be faced as a long period of reconstruction, of serious problems, of adjustment, of the need for every man and woman who had given up his life work to go into the service, to go back to his own ways, to his own road, to continue his own Quest!

CHAPTER X

THE QUEST DEFINED

Again for the Quest Makers there came a period of discussion, of reviewing the past and its methods, of estimating the factors of the present, and of making plans for the future. All the years, up to the time that they had entered into management work, must be carefully considered, and the results must be compared with those years that had passed since that time, both before and during the war.

This comparison made one thing absolutely plain. The decision to enter into the field of management had been right. The work had proved interesting, profitable and worthwhile. The results were not only satisfactory installations and clients ready with repeat orders, but an accumulating body of data that made each succeeding installation quicker and cheaper for the client, and a much simpler problem for the installers.

Equally right had been the decision that management, while perhaps in its teaching and some of its other aspects an art, is fundamentally a science, and must be conducted as a science, by the laboratory method, and with the most accurate of measurement, with an intensive study of the minutest details. It is true, there had been some criticism that the work placed greater emphasis on motion study than on the installation of a complete plan and mechanism of management, but, as a famous engineer was to say in later years, "It does not matter. They are exactly the same."

The decision having been made, then, that the study and installation of scientific management was their fitting life work, in that it furnished durable satisfaction, they were able at last, after all these many years not only to see but to define the goal of their work. This was to find The One Best Way, fitted to become not only the standard but the superstandard. They set, as their goal, The One Best Way to Do Work, derived from all the available information, from all possible study, and as looking forward to an ideal One Best Way, toward which all improvements must be made.

It was for this then that they were to search, keeping careful records of their progress; refusing to be deviated by any transitory, temporary opportunist's reward; striving for vision and for the power to make the vision come true.

This fundamental decision having been made, various minor problems presented themselves. Was Providence the place to live? Should their activities be limited in any way as to location of installation; type of installation; size of plant in which the installation was to be made; length of time that it was necessary to cover, and nature of service offered?

There were at this time factors of other problems to be considered that had not been so important when the decision to move to Providence had been made. At that time Frank's health had been perfect, and his strength and endurance marvelous. At that time it was necessary to be in a college town, that the wife might give the regular attendance as well as the study necessary to take her doctor's degree. At that time the children were younger, and the problems of education not so pressing.

Things had changed now in many respects. There were prospects of even more traveling. There was even greater need of being near the engineering center in order to keep in close contact with the literature; with the lectures; with the work of others; with latest laboratory findings in all fields. They recognized much more strongly than they ever had, or at least far more consciously, that management is only one of a group of human sciences, and that in order to succeed it is necessary to keep in touch not only with the engineer and with leaders in the material sciences, but also with economists, sociologists, psychologists, psychiatrists and others.

While there still remained necessity for contact with the colleges, this could be obtained without living in a college town. In fact it could be better obtained by living near a large university, and where travel to other centers of college activity was easy and swift. Frank's health must be considered from that time on and probably throughout the length of his life. He had given his health and almost his life for his country, and while he did not regret the gift, he must not refuse to remember that what was once given could never wholly be returned. He must eliminate night travel. He must, if possible, slow down a little, take life a little easier. He must at least watch his strength and endurance.

He established a few rules to govern his conduct that proved of enormous help. Never to appear on a client's work or to remain on a client's work unless he could give 100 per cent of his services.

To arrange his working conditions on the job, traveling and at home in such a way as to eliminate the largest amount of fatigue possible.

To live up to his principles of functionalization, and to delegate all possible work to others, retaining himself that which he could best do, and where he could render the most help.

Having made these rules, he determined to get the best expert advice as to his physical condition, and to follow this, but otherwise to put his health entirely out of his thoughts and devote himself to his Quest.

The decision was easily made and strenuously followed. Never was such a fighter! If Frank has been pictured here as anything but a rushing, tearing, dominating force, it is because to his fam-

ily he was just "Dad." To the world, friends and foe alike, he was the typical warrior, chafing at peace, glorying in opposition, fired with enthusiasm for the causes he believed right, ready to sacrifice himself ruthlessly, to put things through. Never beaten, because unwilling to acknowledge defeat. And always a happy warrior, because work was a joy!

The question now was—Where could the fight best be waged?

There were other things to be considered.

The question of the education of the children, while not more important,—because the education of older children is in nowise more important than that of younger children,—offered new problems, as the high school period and the entering of college became imminent.

Providence had excellent schools, but the children were very far from the ones that they attended. As they grew older, too, the little yard at Brown Street seemed cramped and unsuited for their amusement, and the campus a playground for babies.

It seemed then that they must go. But it was not a step easy to contemplate. Aunt Anne, and her family group, only a few blocks away, seemed an integral part of the household. Grandmother, father, mother and children all had made friends whom they were loath to leave. The Providence Engineering Society meetings; The Town Criers luncheons; the debates at the Wednesday Club; the little contests at The Music School. Where again would they find principals or teachers who took such an interest in what the children did, and cooperated so heartily in every new plan for their improvement? Where such friends as Jack and Margaret, Joe and Margery, Billy and Grace, and the Freemans?

Fortunately, the summer problem had already been solved. While Frank lay sick at Fort Sill and later at Walter Reed, it came to him that the one place where he could recuperate best and get all the sunshine that he felt he needed was Nantucket, where he had worked as a boy and where he and his mother had spent one happy summer while the family visited California. To Nantucket he went on crutches, receiving a real Nantucket welcome, and selecting the little bungalow and the two lighthouses that were to become a permanent summer home. When he left Walter Reed it was to go directly to "The Shoe," to find the large tower "Cyc," furnished as his special den and study, and the little one "Mic" transformed into an office. There, during the first summer of convalescence on the hot sand he had found it possible to swim when he could not walk. He had gone sailing when it was almost impossible to move; with small boys and girls to help and take lessons in managing the good old "Rena;" with a sane cheerful doctor of the old school to give counsel, the whole beach to offer sympathy and advice during the bathing hour, and to rejoice in his constant improvement; many small

people glad and willing to do his errands; books to write and the coming work to plan, the summer had done more for him even than they hoped for, and Nantucket had become the permanent summer home!

This simplified the problem considerably. So did the fact that both office and household staff offered to make the move and to carry their help and experience into the new home.

Who can ever estimate the difference in home life that loving, helpful service makes, or calculate the effect, not only upon the comforts but on the mental attitude, of smooth running domestic machinery? Such devoted help and cooperation can never be paid for in money or in other material things. The real compensation must come in the fact that the work has been well done, in gratitude, and most of all, in the knowledge that a large group of little children are growing up better in every way because of loving and unselfish care. This reward will be Mrs. Cunningham's and Tom's, all their lives long!

There is, of course, only one place in America that an engineer can regard as a center of his type of activity, and that is New York City, the great workplace of the western hemisphere. It was near New York that they must go. Living in New York seemed impossible for a large family. Frank spent days and weeks looking for a place,—after hours and on Saturdays. Interviewing people, reading advertisements, meeting agents, examining property. He finally found what seemed to him the ideal spot in Montclair, New Jersey. Here was a city of homes, with unexcelled educational facilities. Here was a place, part of the town, yet on its very edge, where the children might shout and play without disturbing anyone. Here were the finest of neighbors; a large, homelike, comfortable old house; facilities for every aspect of the Quest Maker's activities!—an office, a laboratory, a workshop,—room for the rapidly expanding files; a place to entertain visitors: a school for the small children nearby, a high school for the older ones, sufficiently accessible. It seemed the ideal spot. So, one day, into the good old Pierce-Arrow they were packed, and off they went to the new home!

CHAPTER XI.

LESSONS BY THE WAY

Montclair! Who can describe its beauties on a June morning with the pink flowers in full bloom; the lilacs just beginning to go; the lilies of the valley still beautiful; with the rhododendron just beginning to come out and the iris, purple and white; with the wisteria in its full glory; the lawns velvet carpets and the beautiful trees everywhere; with the summer sunshine pouring down and the Sunday quiet over everything? It is a dream of beauty.

Seen as they first saw it, in the fall, with the leaves gorgeous red and yellow, and the mountains a blaze of glory, it seemed a fulfillment of a vision of the happy land. Dad had been careful not to describe the new home in detail, and to keep their curiosity aroused and stimulate their excitement by stopping in front of many an old homestead and asking, "Well, how do you like this?" Each place seemed attractive enough, but when he finally drove up to the place that was to be home, they could only tumble out, almost breathless with the thrill and start to investigate the house, the garage and hothouses and all the possibilities of baseball fields, gardens and homes for future pets.

There was the excitement of starting school and making new friends. The thrill of having all outdoors to play in, of running and shouting without fear of disturbing anyone but the most lenient and friendly neighbors. Here was a real woods across the road, with a brook where one could get one's feet wet. There was the ride up the mountain, and the wonderful view from Eagle Rock, to look far over the country in the day time, or to see the lights of Newark or far off New York at night. Truly, life was like a fairy tale.

For Frank there was the joy of being able to dash into New York in less than an hour. Of climbing into the car and driving off to the many industries of Jersey. Of taking the night train and being able to get up without change at a job almost anywhere, the next morning. Of attending a committee meeting in the afternoon and being able to get home for dinner,—or an evening meeting and being able to get home for the night. Of adding to the books that now stood on the shelf,—the three "Systems," "The Primer of Scientific Management," "Motion Study," "Fatigue Study," "Applied Motion Study," "The Psychology of Management," and "Motion Study for the Handicapped," a collection of technical papers that not only formulated their own views but stimulated discussions, that many other would carry on in many lines of activity which needed help and cooperation.

At last The One Best Home seemed to have been found. The work proved more interesting and stimulating than it ever had been. Much of it was done in large organizations, where the

savings could be great and where a large staff were affected by every change. Into their work, as everywhere, came the realization that the savings of the future must be made in a large collection of minute savings. This was most encouraging, for it meant that the scientific method and the importance of applying accurate measurement would be appreciated and adopted increasingly. There came now also the taking up again of work abroad,—at first in a neutral country,—and the return of all the old interest and stimulus of associating with a foreign type of mind and giving and getting the foreign attitude toward all sorts of industrial subjects. There came the stimulating contact with young foreign engineers, who began increasingly to come to this country, and to look for guidance and placement. There came the interest of watching the speed with which these young students took on the new attitude and the new information, applying all their foreign thoroughness and love for detail, and getting what seemed to young American engineers astonishing results.

There came extended travel to the countries of Europe, with all sorts of experience and information, much to be transferred to the work here. Then too, there came a visit to Czechoslovakia, as government guest, and the opportunity to become intimately acquainted with the work of the Masaryk Academy and to cooperate in it. A short visit, in fact, only a few days, yet long enough to establish life long contacts and friendships, and to take part in starting a great new Republic along lines of conserving waste and searching for and adopting The One Best Way to do Work.

Through these years their correspondence with all types of scientists in foreign countries grew. Many of these had been visitors to this country, to become acquaintances and then friends. Others were simply acquaintances and friends by correspondence, but seemed scarcely less well known. With this came the exchange of data, not only in fields of scientific management but in the field of education and in that of psychology.

Almost since the beginning of motion study the work of fatigue study had gone side by side with it, and it proved a most profitable one. It was welcome in the plant, for it was a non-controversial work that enlisted the attention and cooperation of employer and employee alike, that undertook problems of common interest, in noncontroversial fields, and showed results profitable to everyone. It furnished also a point of contact with workers in all types of fields, with research men, with installers, with labor leaders, with unions, and with workers in the plants.

Thru The Society of Industrial Engineers and its Committee for the Elimination of Unnecessary Fatigue the work gained and persevered and George C Dent, the Executive Secretary, Col. W. G. Sheehan, Professor Geo. H. Shepard and others formed what was almost a brotherhood dedicated to this work.

The One Best Way, far from a narrowing influence, proved to be most broadening, partly because it had put such a strong emphasis on likenesses. It took up plant problems in the production end, in the selling end, in the office end, in the financial end, everywhere throughout the plant and showed that in their essential elements these problems were often alike. What are the quota, the budget and the task but three words in different vocabularies, all expressing the same underlying idea? As the methods of accurate measurement became understood, and as their application to all fields was realized, what had seemed to be fundamental differences proved to be merely superficial discrepancies and a surprising amount of transferrance of elements of methods became possible.

Yet,—The first advances into a new field never cease to be a romantic adventure. The survey or the process chart can never grow old or uninteresting. To enter a new plant and make a process chart is not unlike sweeping a field of the heavens unknown to one for the first time with a high power telescope, or better still, with the recording camera, and studying the results. There is always also, the concealed, but never to be forgotten, romance of the common place. What Elbert Hubbard called the thrill of discovering the obvious.

During the first year in Montclair, grandmother quietly slipped away, without suffering, having kept to the last her vigorous mind and body, her enthusiasm for life, her interest in everyone and everything and her consuming passion for advancement and education. She held a place in her son's life always, that could never be filled, and an influence that could never be equalled. She had devoted her life to her children and her children's children, and she received in return that type of enduring beautiful devotion that is the highest and finest reward any mother can receive. Her children rise up and call her blessed, not only for what she gave, but for what she received in return. Her gifts had been bountiful. Strong and healthy bodies and minds, and the passion for education which she transmitted and then fostered as long as she lived.

They realized increasingly the truth of the lesson she had taught, that education is one of the most important things in life. Nothing could have been greater than its importance in the science of management. Nothing they had ever learned proved unuseable, or far afield and it was not only the collecting of data, the storing of material to be used when needed, but even more the trained mind, the method of attack, knowing where to look for what was needed, and how to use it when it was found.

They came to realize too, the paramount importance of right habits of learning. The open mind, the attentive mind, continuity of purpose, to ask questions and then more questions, but always to attempt to record the replies, to study and to use these as a basis for still further questions.

To keep records not only on what are set aside as recording days but always, to get the notebook habit, and to realize that, far from interfering with memory, it simply frees the memory from the superfluous details, leaving more time to be devoted to memorizing the important things of life and these in a logical sequence.

To file all data, symbolizing the notebook and other material as it is acquired, while its possible uses are first in the mind.

To gather data far ahead of one's needs, and then to have the courage to put it away and pay no attention to it until it is needed, when it will appear automatically along with other data on the same subject to serve its purpose.

To read constantly, to have a book always available, a small book that will slip into the pocket during periods of avoidable or unavoidable delay or during rest periods. To read much along the lines of one's work, and much always in other lines. This broadens one and supplies those things that one's life's interests do not themselves supply.

To realize the vital importance of habit. Habit that can be a frightful master and that can be, rightly used and acquired, the best and most faithful of servants. To have always a keen regard for the necessity of rest, recreation and change, but to have a horror of profitless idleness, of "passing the time," of that most insidious and frightful of waste, doing nothing, thinking nothing, being nothing.

To get the habit of saving, even savings as small as a half a second, and to apply this habit not only to industry but in all life.

To train one's self as well as others in accurate measurement even down to half a millimeter. To think in terms of accuracy, and scorn fuzzy mental attitudes.

To remember always that vision,—that great dreams worth dreaming and with incentives that push forward to make dreams come true,—is one of the finest things of life,—but to scorn day dreaming, based on unreality; profiting no one; helping no one, a destructive force.

These are some of the lessons that came to them through these years,—came as a part of daily experience, some of them through mistakes and with a clarion call to purposive actions. Some of them as warnings. Some of them as interpretations of success.

As the children grew older, they began to have their own ideals, their own goals, and to look forward to their own Quests. This too, brought valuable lessons. It is so easy to feel that only your life work is truly fascinating; that what you see to be best and most beautiful is best and most beautiful for everyone. It is harder to realize that other goals are worthwhile too. The One

Best Way is not something for one and not another. It is not something that may be a blessing or may be a curse. It is a universal possession. It has individuality. It changes. It grows. It is the goal that each one visions, and then tries, perhaps, not so much to reach as to become. The Quest for it, far from making one narrow or uncharitable or unappreciative, should make one broad and cooperative and quick to see and utilize likenesses.

One thing is sure. It does lead one to appreciate skill, expertness, excellence wherever it lies. The grace and rhythm and perfection of motions of him who knows and knows that he knows and does what he knows, no matter what his work may be.

CHAPTER XII.

WHITHER

And so the Quest Maker has gathered around him a group that are Quest Makers. It is not altogether a family group, although the family are part of it. It consists of young engineers in the organization or formerly members of it, who have the same goal in view. It consists of friends and colleagues and co-workers in this country and abroad and in the Orient who long for and search for The One Best Way. It consists of many workers in many fields of activity, far separated. Some of them have nothing apparently at all in common, except the passion for better methods.

It is a summer evening in Montclair! Frank has reviewed the plans for the coming week, for the summer, for the year, for the whole future,—during the morning hours. The family has gathered, as always, around the Sunday table to chat and joke and laugh; to hear of Dad's trips; to tell the doings of all the week; to discuss the Sunday topic that he has brought home, as something even the youngest can be interested in and all can be stimulated by. Then there has come the baseball game and the wild shouts of joy as the oldest or youngest tears around the diamond with Frank and Louise as cheering spectators. And now it is twilight hour, and almost time to gather together for the last chat of the day. All are at home but the college girl, but she is in the chat and the plans. In a week or two school will be out and the eleven children on their way to the long happy days at Nantucket, while Father and Mother go overseas for a few week's rest and to attend the World Power Conference in England and the Prague International Management Congress in Czechoslovakia.

It will be a test summer for everyone. Can the children, with the help and counsel provided, show themselves capable of managing the summer and making a success of it? Can the parents bring back enough to stimulate and interest and inspire the group, to justify the few months away? Will the reunion time prove that real advances toward the family Quest have been made?

That will be the time for another "rehearing" as Grandma used to say and for a review and a long look ahead. The family, what is it but an experiment. The Quest of The One Best Way! What is this, also but an experiment? To combine the two, to make The One Best Way for the family the aim of the Quest, to make the family group the best group for attaining the Quest all this is still in the experimental stage. What will prove success? Not what Frank has accomplished or will be able to ac-

comply, though this has its place in the final result. Not what this generation accomplishes or may accomplish, though this has also an important place. The proof of the value of the experiment, the real outcome of such a Quest will be its effect upon future generations. Whence? Yes, perhaps, as a matter of historical interest. What? Yes, perhaps, as a matter of what will soon be historical interest, too,—a long infinitesimal part of the life of today. But above all,—whither?

FINAL WORD

Suddenly, on June 14, 1924, Frank went, not abroad, as he had planned, but "West," as soldiers go.

The Quest goes on!

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